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EKISTICS

ABSTRACTS ON THE PROBLEMS AND SCIENCE OF HUMAN SETTLEMENTS

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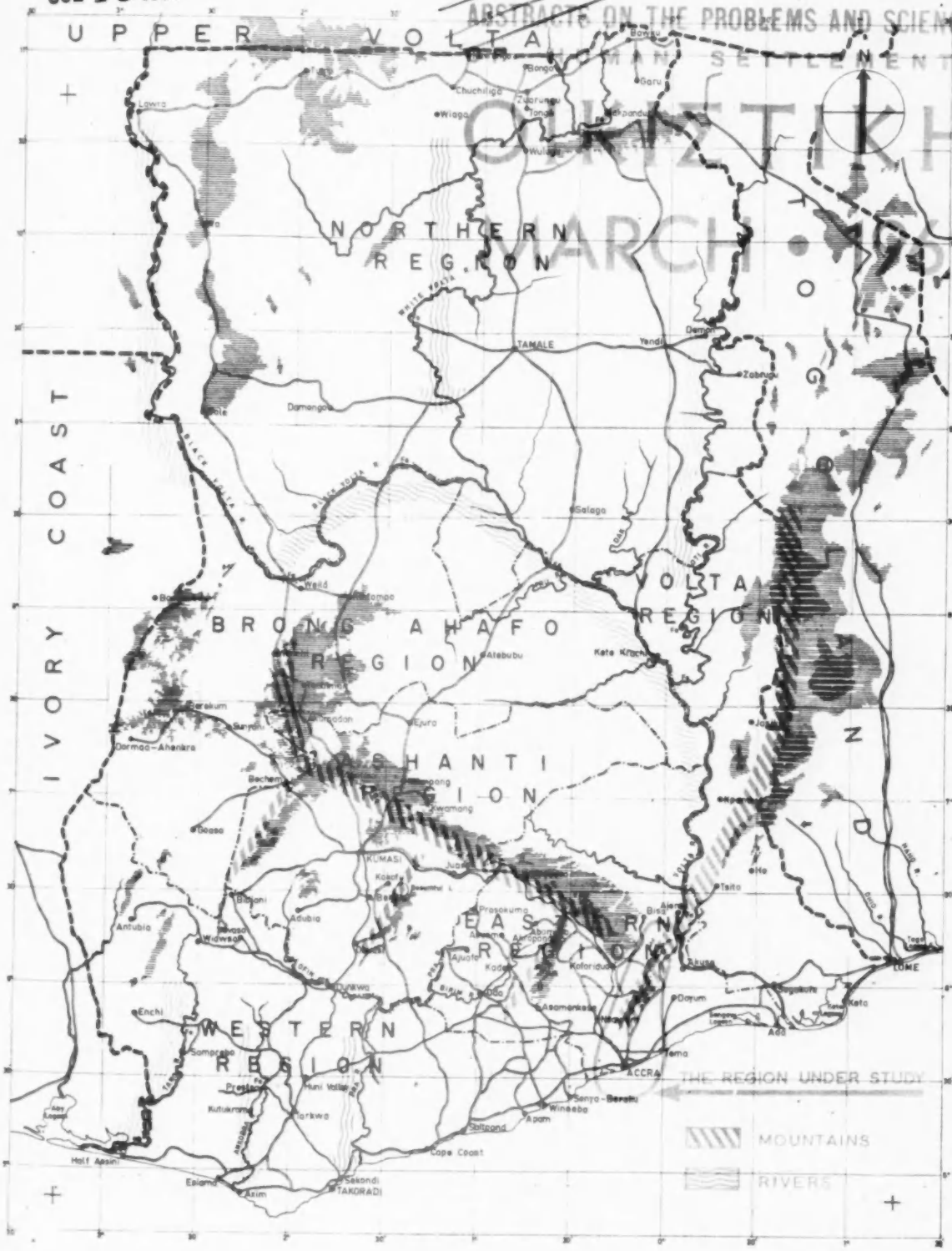

THE TITLE EKISTICS comes from the Greek verb OIKO, meaning settling down, and demonstrates the existence of a science of human settlements conditioned by man, influenced by economics, sociology, geography and technology.

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EKISTICS

REVIEWS ON THE PROBLEMS AND SCIENCE OF HUMAN SETTLEMENTS

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EDITORIAL

This is the first of several issues of EKISTICS to be mainly devoted to studies of settlements in some particular region: in this case Africa. Unfortunately there are as yet so few studies and general information is so sparse that this section only consists of four articles: Two on Algeria, one on Nigeria and one on Ghana.

Sandwiched between two opening articles dealing with broad issues are four which touch on different aspects of the "perceptual form" of the urban scene: in other words its impact upon our senses and emotions rather than upon our reason and pocketbook.

This issue opens with a closely reasoned article by Ernest Weissman, of the United Nations. He starts by pointing out the rapid increase of urbanization and the need for means of understanding its complexities in order to make reasonable plans. He ends by pointing out the necessity for interrelated development of planning at all levels - from national statements of economic and social goals to plans for specific areas.

D. J. Bogue then makes a somewhat similar plea within the compass of demographic studies. He asks that these should be divided and grouped to relate to logical units of human geography and not simply be analysed on a national basis. Even those Administrative boundaries which may once have had some logical basis tend to live on long after this basis has lost all meaning and Bogue makes out a case for both macro and micro analyses of demographic data based on areas likely to be treated as units for planning purposes: on the one hand entire metropolitan areas, on the other specific slum districts.

Perceptual Urban Form

Our emotional reaction to our environment is coming to be recognized as having an importance that must be taken into account. Research into the perceptual form of the city has been proceeding at the Massachusetts Institute of Technology and two members of its faculty have recently published some of their findings. A review is included here of Professor Lynch's book "The Image of the City" and an abstract of an article by Professor Kepes. The first considers the city must be able to be easily mapped out in the mind to be memorable. The second discusses the importance of "periodicity": of clearly articulated sequences of visual activity and repose.

The next article which presents different facets of the green landscape within the city again stresses their emotional impact and the need for both macro and micro associations: for spaces which give a sense of relationship with the total landscape (the cosmos) and for spaces which breathe an intimate friendliness. Following this comes an article from Britain upon the subject of selecting "servicing areas" along major limited access highways. Together with some practical notes- Britain is just embarking upon a large-scale program of major motorways - there author touches on the emotional impact of the use of these high speed routes and the need and the place for changes of pace and re-introduction of the human scale.

Urban Development in Africa

Two new settlements in Algeria are illustrated. Both have endeavoured to relate the particular needs of the surrounding environment to the final plans. The cost of the individual housing units at Djenan el Hasan - which fall between a sloping high rise apartment building and modern cliff-side cave-dwellings - is comparable to the cost of providing a flat of similar area in a multi-story building. A 450 square foot public housing flat in Jerusalem which costs $3300 to construct (EKISTIC 9:56, p. 434-436) can be compared with 190 square feet for $825 in this Algerian project. The new town of Timgad has a special interest because of its proximity and its parallel plan to the ancient Roman city.

Ernest Weissman pointed out that (in 1950) every fifth inhabitant of the world lived in a city with over 20,000 people. Yet in Nigeria (in 1958) only about 1/30th of the people as yet live in cities over 20,000 and in Ghana there are only 3 cities of over 100,000 people. This points out the tremendous urban development that can be anticipated in the new Africa nations South of the Sahara.

The major cities of Nigeria are struggling with their growth problems with few physical plans or planners - but under a national economic development plan. As pointed out by Weissman, a lack of adequate physical urban and regional planning may have repercussions resulting in the failure of many social and economic goals of the national plan. But, the plan for the Accra-Tema-Akosombo region by Doxiadis Associates for the Government of Ghana very carefully relates the specific urban problems to the national economic development program. It has been made with the specific thought of bridging national goals and urban needs so that development may progress harmoniously at all levels. It is also a further example of the application of the notion of Dynapolis to a specific situation.

Abstracted from "News Sheet of the
International Federation for Housing
and Planning" Number LVII, December 1960.
Pages 4-6.

URBANIZATION AND REGIONAL PLANNING

Ernest Weissman

1. Ernest Weissman, Director of the Housing and Planning Branch, of the United Nations, submitted this paper to the 25th World Planning and Housing Congress, May 28 - June 3, 1960 at San Juan, Puerto Rico.

2. The explosive growth of cities is breaking down existing social and economic institutions in all parts of the world. Technological advances in construction, transport and utilities are notable but they are not being applied at a significant rate in most urban areas. Grave economic and social imbalances are growing out of this situation whose outward physical symptoms are bad housing and poor community services, choked-up city traffic with excessive travel time to work; filth, squalor and disease. Gang activity, juvenile delinquency, crime and vice are the more conspicuous aspects of the physical decay and a disorganized urban economy. While these conditions affect an ever-growing number of people already established in cities, they mostly involve newcomers, many of whom belong to the lower income group. These newcomers, more often than not fail to be accepted by their new community and its institutions.

3. The world's population amounted at the beginning of the past decade (1950) to some 2.5 billion. It may reach by 1975 the 4 billion mark and at the end of the century it may be as much as 6 billion. Progressive industrialization must provide the means of livelihood for the larger part of this increase in population, by necessity concentrate in urban areas.

4. Under the impact of current demographic movements and technological changes in industry and agriculture, and in power and transportation, migration from the countryside to the city has become more rapid and intensive. Congestion and blight are now affecting vast urban and rural areas and they are presenting seemingly insoluble problems of financing, organization and reconstruction.

5. Economic development programmes have tended to intensify urban-rural migration particularly when sufficient attention has not been paid to corresponding rural development. As a consequence living conditions in the villages continue to deteriorate, a growing number of rural people continues to drift

into towns, and large sections of the urban population (the so-called "lumpen proletariat") and most rural people remain untouched by their country's economic progress.

6. In 1950 every fifth inhabitant of the world already lived in a city with over 20,000 people. In the twenty-five year period ending in 1975, according to various estimates, between 280 and 540 million persons will be added to the population of Asian cities with over 20,000. In Latin America 62 metropolitan cities with over 100,000 inhabitants already account for over 40 per cent of that continent's population and a group of eleven among them have reached a level of employment in industry comparable to New York, Paris and London, namely some 39 per cent. Finally, the population of the United States of America is expected to double by the end of the century and 97 per cent of the addition will be concentrated in cities. In fact, a second America will be built in 4 decades.

7. The major difficulty of the current trend in urbanization is that in all parts of the world more people already live in cities and industrial centres than can be supported by employment in existing industries. The level of living of the migrant population is therefore shrinking, not only in terms of physical surroundings and social environment but also from the point of view of family income. Economic and social measures are therefore being tested in town and country aiming at discouraging rural poverty from transplanting itself into the urban environment.

8. Regional Development and Regional Planning. Suitable planning on a regional scale may help to guide urbanization and internal migration so that they can facilitate rather than impede development. Such planning could first of all help to strengthen the economic basis of existing urban agglomerations. And secondly, it could create alternative centres of attraction for the movement of rural people to the cities, the brunt of which movement is now being borne almost entirely by large metropolitan centres. Such alternative centres could be established through judicious location of new industries and the development of transport in a more rational pattern.

9. The requisite and the consequential changes in the physical environment however, are only rarely recognized as equally important aspects. But unless these are anticipated and planned for, the desired social gains may never materialize and even the strictly economic goals of the plan may fail to come through. It is the task of physical planning to organize the relationships of the different components of the development programme by assigning, within a given territory, areas for industrial, agricultural, residential and social and cultural uses; and by laying out a rational pattern for transport, communications, power and other utilities. Physical planning thus provides an opportunity to reconcile sometimes divergent interests with the requirements of human welfare; and it may help at the same time to establish a workable urban-rural balance within a developing region.

Abstracted from E/CN. 9/CONF. 2/L. 18
United Nations Seminar on Evaluation and
Utilization of Population Census Data in Asia
and the Far East. 20 June - 8 July 1960.
Bombay, India.

POPULATION ECOLOGY: STUDIES OF POPULATION DISTRIBUTION AND DENSITY, MEASURES OF URBANIZATION AND PROBLEMS OF URBANIZATION

D. J. Bogue

1. This paper was prepared for the 2nd Regional Population Seminar, by Donald Bogue while he was at the Demographic Training and Research Centre, Chembur, Bombay. Donald Bogue has participated in two United Nations planning seminars where he has presented papers on the methods of analysing population censuses and on the various different kinds of analyses possible. (See EKISTICS Vol. 9:52, 97-101; 9:55, 373-378).

2. It is widely appreciated that in almost no country is population evenly distributed over the land, with the result that the pattern of population distribution that does exist is of interest and concern to many people. The variations in density and points of concentration are associated with variations in the physical environment -- rainfall, latitude, slope, soil and altitude. But they are also associated with the type of technology, the form of economic organization, the total demographic situation, and other economic and social factors. Since this latter group of influences is continuously changing, each time a new census is taken one of the things considered most important to know is how the pattern of population distribution has changed, as a result of economic development or other changing conditions. In order to explain this distribution, and why it is changing as it is, it is necessary to consider the demographic, geographic, and economic factors simultaneously. In many places, this kind of analysis is known as "population ecology" or "human ecology". Perhaps a less pretentious term is simply "population distribution", although this overemphasizes the purely descriptive aspect.

3. The field of population ecology may be defined as the study of a nation's population in terms of areal subdivisions such as regions, states, socio-economic areas, urban-rural residence, or other units where the object is to reveal place-to-place variation and to develop an understanding of that variation.

4. Analysis of population distribution may be carried out at three different levels, according to the type of areas employed:

a. Regional demography - the study of population distribution among continents, regions, states, or other major geographic, economic, or political units.

b. Community demography - the study of the population of communities or types of communities. This would include the study of urban and rural populations, and types of communities or villages classified in various ways.

c. Micro-demography - the study of small segments of population that are parts of a community. An example would be the study of the population of a large metropolis in terms of wards, census tracts, or other subdivisions.

5. As yet, most nations have paid inadequate attention to the study of population distribution -- on all three of these levels. Yet these are the types of population studies that can be highly useful to planners who are trying to work out a solution to particular problems. When planners have a problem to solve, usually that problem refers to a particular region, a particular city, a particular type of community, or even to a typical part of a community, such as the slums. Among the first things they need to know is "How many people are involved?", "What are the characteristics of these people?", "How do they earn their living?", etc. Answering such questions calls for subdividing the total nation into planning areas, and then assembling population facts individually for those areas which are of extraordinary interest or concern. This would include not only a study of the total number of persons in each area, but also the vital processes (birth, death and migration rates) and the population composition (basic social and economic characteristics) of each area. It also would include the study over time of the change in the size, composition, and vital processes of the population in each of the areas.

6. The entire array of potentially useful research studies in the field of population distribution may be very succinctly portrayed by means of a table. By studying Table 1 and placing an X in each cell which he thinks is worthwhile (followed by ranking the various "X"ed items in priority) it would be possible to map out very quickly a programme of research in population ecology. In doing this, of course, one must draw a horizontal line through all items for which the necessary census or other data are lacking in that nation. Note that this table makes provision for noting change.

7. Units of Area for Analysis. On all three levels of the study of population distribution, it is highly important to use units of area that are meaningful in the context in which they are employed. For many purposes it is adequate to use states, or groupings of states or provinces, as the units for study. However, most states or provinces are highly heterogeneous entities whose

TABLE 1. TABULAR REPRESENTATION OF POSSIBLE MEANINGFUL STUDIES OF POPULATION ECOLOGY IN A NATION AT THE TIME OF A NEW CENSUS

Subject	REGIONAL DEMOGRAPHIC ANALYSIS		COMMUNITY DEMOGRAPHIC ANALYSIS		MICRO-DEMOGRAPHIC ANALYSIS	
	Status at last census	Change since previous census	Status at last census	Change since previous census	Status at last census	Change since previous census
POPULATION IN RELATION TO LAND:						
Gross density--ratio pop. to land.						
Density per acre of arable land.						
Density per agricultural worker.						
Population per million calories of agricultural output						
VITAL PROCESSES						
Intercensal (or annual) rate of growth						
Intercensal (or annual) rate of natural increase						
Fertility						
Crude birth rate						
Children ever born, age adjusted.						
Ratio of children to women, age adjusted ..						
Mortality						
Crude death rate						
Age specific death rates.						
Life Table, life expectation						
Infant mortality rate ...						
Rates for particular causes						
Migration.						
Crude migration rate:						
In-migration						
Out-migration						
Net migration						
Age, sex, other composition of migrants						

(TABLE 1 Contd .....)

	REGIONAL DEMOGRAPHIC ANALYSIS		COMMUNITY DEMOGRAPHIC ANALYSIS		MICRO-DEMOGRAPHIC ANALYSIS	
	Status at last census	Change since previous census	Status at last census	Change since previous census	Status at last census	Change since previous census
POPULATION COMPOSITION:						
Age						
Sex						
Place of birth						
Ethnic origin						
Literacy						
Language						
Household status ...						
Family status						
Marital status						
Mean age at first marriage						
Educational attainment						
School attendance of children						
Religious affiliation						
Labour force.....						
Unemployment, underemployment						
Occupation						
Industry						
Status						
Income						
Housing condition ..						
POPULATION PROJECTIONS AND ESTIMATES:						
Age-sex						
Number of households						
Number of new families						
Number of school children						
Number of old age dependents						
Number of marriages						
Size of work force						
Number of new workers yearly						
Number of retirements yearly						

boundaries are more a matter of historical accident or political expedience than a meaningful subdivision of the population along basic economic or environmental lines. Under these conditions, it may be advisable to devise a new set of socio-economic areas that would be useful to planners, geographers, economists, and other professional analysts who must have a more refined and exact picture of internal variation.

8. For regional demographic studies it may be necessary to construct new and more meaningful and realistic socio-economic regions and subregions by combining minor civil units of territory, such as districts or counties. On the level of community demography this recommendation may call for a more realistic delimitation of the boundaries of communities. For example, some very large cities have grown far outside their legal boundaries, and are ringed with many small towns and places that really are an integral part of the metropolis. This may require the establishment of a statistically-delimited "metropolitan area" for these places.

9. Almost no nation has seriously considered the problem of studying parts of communities, as specified by micro-demography. Yet almost every one of these nations is being faced with serious urban problems -- slums, hutment settlements, refugee settlements, neighborhoods where there is a great concentration of persons of one nationality, one race, or one class, and concerning which there is a problem. Under a good system of area classification, it would be possible to identify those parts of the city wherein these conditions prevail and to make special tabulations for such parts.

10. Explanatory Analysis. Once the demographic measures have been prepared for a set of regions, communities or other areas, it immediately becomes apparent that there is a great deal of variation between them. The national average for any statistic, such as a birth rate, is seen to be only an average of the birth rates for many particular places, and the rate for the various areas differ rather widely. The first task in the study of population is to show that this variation exists. The second task is to explain it, or to find out WHY or WHAT CAUSES IT to exist. This calls for an additional stage of research, in which variations in the demographic measures are correlated with measures of other factors that might be the causal factors. In this phase, it must be emphasized that the "explanatory variables" usually are not demographic variables, but in most cases they represent some aspect of the physical environment, some measure of economic activity, or some index of human effort or desire.

11. Urbanism as a Special Problem. Urbanization studies might group the data into areas of the following classes:

a. Urban and rural types of community

b. Sizes of community

c. Economic base (economic type) or community

d. Physical environment of the community

e. Types of industry upon which the population is dependent.

12. It will be necessary to establish a valid and useful definition of what constitutes "urban" and what constitutes "rural" population. This has proved to be a rather difficult problem in many nations. The definitions of "urban" places sometimes is based on legal or administrative considerations, and has little reference to the actual type of life lived in the place, or how well the definition conforms to the definitions used throughout the world or the definitions recommended by international organizations such as the United Nations. It is to be hoped that before they prepare their urban and rural and other type-of-place tabulations for their new censuses, all nations will review the problem in the light of the United Nations recommendations, and use definitions that foster comparability and yet are meaningful within each nation.

13. It has been said that there are many special topics of urbanization for which the demographer may be called upon to do research. Actually, there are few if any new demographic topics that are unique to the urban situation. They are simply the same topics listed in Table 1. The new element is that more experts now appreciate that it is essential that they obtain these items of information for urban areas of each region, for individual cities, and even for parts of individual cities. This is only another way of saying that this branch of population distribution is coming into prominence. It does not mean that a whole new body of demographic techniques or even a new set of demographic questions is being created. It is simply the raising of old questions for a new class of areas -- the cities.

14. Conclusion. During the 1960's, it will be a strategic mistake for demographers to stick closely to the data for the entire nation, and to fail to perceive and study the wide variety of changes and trends for particular regions, communities, or parts of communities. Some of the largest research opportunities, and some of the most valuable research, will come from the demographers who do grasp this idea and exploit it to the fullest extent that the data for their nation will permit.

A review of "The Image of the City"
by Kevin Lynch.
Technology Press and Harvard University
Press, 1960. $5.50.

THE IMAGE OF THE CITY - A REVIEW

Jacqueline Tyrwhitt

1. Kevin Lynch is a professor of city planning at the Massachusetts Institute of Technology and this book is one of the results of a five year research study on the perceptual form of the city sponsored by the Rockefeller Foundation. It therefore deserves to be treated with considerable respect. Further it is issued by the Joint Center for Urban Studies and thus bears the imprint of both Harvard and MIT.

2. The book's size, format and price are to be highly commended. We have had our fill of huge tomes written in latinized prose and studded with professional dialect. It is a relief to be able to pick up a small book, seemingly written in clear, uncluttered English, whose wide margins contain a number of lucid and lively diagrams as well as all relevant cross references. This book also includes many good photographs and beautifully drawn, though illegible, maps.

3. The book conducts the reader through the central areas of three very different American cities - Boston, Jersey City and Los Angeles. It discusses and analyses these from the viewpoints of long-term residents consistently employing a series of five "types of elements" to describe urban events: paths, edges, districts, nodes, landmarks. One can accord warm praise and gratitude to the author for his courage in inventing this vocabulary, and for his choice of simple English words, though the use made of them is not always so simple, particularly in the case of an "edge".

4. The purpose of the breakdown of the urban form into these five elements is to facilitate identification and description of points of recognition in each city, regardless of their visual quality. Value judgments are strictly debarred. But this is a book by a city planner not by a geographer, and city planners cannot be content with mere identification. While scientific means must undoubtedly be employed to marshall relevant facts, these must be of such a kind and assembled in such a manner that it is possible for a plan to emerge: a plan which is both something new and forward looking, and simultaneously the quintessence of all that has been. Something of this sort is foreseen by Kevin Lynch on page 108 when he states: "In duscussing design by element types. . . path would expose

and prepare for the districts and link together the various nodes. The nodes would joint and mark off the paths, while the edges would bound the districts, and the landmarks would indicate their cores".

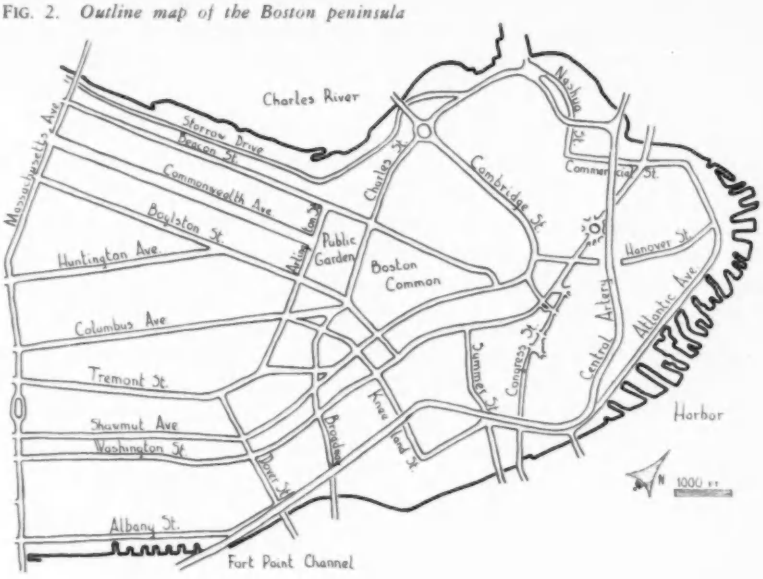
5. In entering so vast and unexplored a field as the study of urban form it was probably necessary to start with a fairly simple and direct hypothesis, but I found myself disconcerted by the one chosen. The fundamental assumption upon which this book is based is the over-riding value of "clarity and legibility" in the cityscape. "A legible city would be one whose districts or landmarks or pathways are easily definable and are easily grouped into an overall pattern. This book will assert that legibility is crucial in an urban setting. . . Although clarity or legibility is by no means the only important property of a beautiful city, it is of special importance. . ." It is in fact accepted as the key.

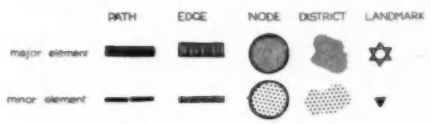
6. But who dreamt up this notion? On page 10 Kevin Lynch gives us his source by quoting (incompletely) from the opening sentence of a short paper written by Paul Stern in Munich and published in 1914 in Logos, a philosophic quarterly. Stern was here contributing to a long discussion of the nature of "artistic form" inspired by the writings of Dilthey, Riegl and Wolfflin (one of the group responsible for the quarterly). Immediately following the sentence quoted by Kevin Lynch, Stern carefully states his own position: "In truth neither clarity in the representation of external form nor the . . . . expression of an inner life or experience is sufficient in itself to create art: each depends upon the other." (Logos, vol. V., p. 165). Later he elaborates: "when so to say the clarity of the artefact coincides with the clarity of its inner content, then only has real artistic "form" been attained. Therefore one must not believe the essence of artistic form has been reached when the form of one particular arteface is brought clearly into appearance, even though, on the other hand, clarity of appearance must be recognized as a precondition of artistic effort" (p. 169).

7. Apart from the danger of accepting as a key notion something that Stern was very careful to qualify and place in context, there is the added predicament of an implied equation of Stern's subject, "artistic form", with the form of a city. Assuming this relationship were accepted it is difficult to see how it could be reconciled with methods of statistical analysis since Stern himself warned (p. 171) that "neither for artistic creation nor for artistic judgment can it (the intellect) suffice".

8. Firmness, commodity and delight were said long ago to be the three attributes of good architecture. It would not be unreasonable to construe firmness as "legibility" - a clearly defined structure - in discussing the

FIG. 2. *Outline map of the Boston peninsula*





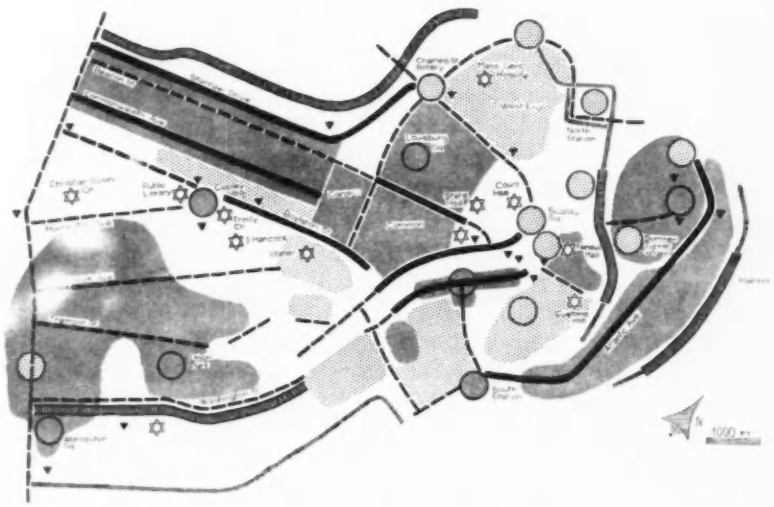


FIG. 3. *The visual form of Boston as seen in the field*

design of a city, and it can certainly be accepted as an important component in urban design. Commodity, which might be construed as land use, can be said to fall outside the scope of this book. But what about delight?

9. It is true that the consideration of delight takes us onto slippery ground. The puritan conscience finds itself in a dilemma, for it not delight sinful? But can our national ideals of "gracious living" be confined within the walls of a suburban ranch - type house? Is it not possible already to write some hard cash values into urban delight: into urbanity? We know that our ancestors believed that "Where there's muck there's money" almost to the extent to considering any factory inefficient if it were not both dirty and unsightly. But now the tide has turned so strongly that it is difficult to distinguish a modern landscaped factory from a new museum or some other civic building. Pride in the setting of the individual components of a city might well be led on to pride in the form of the city itself, but this is something different from - though not opposed to - legibility.

10. "A clear and comprehensive image of the entire metropolitan region is a fundamental requirement for the future" states Kevin Lynch (p. 119). But is this so? A graphic and pleasurable image of one's immediate home environment (one's habitat), a clear knowledge of one's regular paths of movement to and from it; well structured images of the particular areas of which one is going: these are certainly acceptable desiderata. But what can be the advantage of carrying around a mental map of the entire metropolitan region?

11. It is just possible that an alternative, and conceivably more valid, hypothesis for organizing an image of the city might be Henri Bergson's original notion of "duration", or some of its later derivatives. This notion made a distinction between time and duration - which might also perhaps be interpreted as impact. Thus the mental impact of entering into an urban space arousing an emotional response could seem to occupy a fuller amount of time - duration - than the time occupied in driving along several nondescript streets, although the first might be measured in seconds and the other in minutes. Such an hypothesis could make allowances for the necessary psychological process of periods of rest - pauses - between moments of great visual awareness. It is only the complete stranger or the mentally insane who make any attempt to give equal attention to everything they pass by: they have to give each item an equal value because they are (temporarily or permanently) deprived of a capacity to select and discriminate.

12. If this book had only purposed to be a well-tested technique for describing urban form one would have nothing to cavil at. This in itself is a very considerable and useful achievement. But it claims to be far more,

and it is this which gives grounds for uneasiness. Recalling the many able people who have been associated with this project, one cannot help wondering at what moment all courage left them. At what moment was it decided to steer clear of anything that could possibly be interpreted as aesthetic judgment? And, when it had been decided not to trust their own views, how did it come that they were prepared to rest their judgments upon the assembled opinions of "a small sample of . . . people who were long resident or employed in the area" of the three towns of Boston, Jersey City and Los Angeles? This hiding behind the barrel under the cover of scientific inquiry seems not unlike accepting the result of a public opinion poll in lieu of going out and recording one's own individual, independent vote. But it goes further. A group of people who had given years to the training of their visual faculties were prepared to abdicate in favor of a small sample of public opinion, and even this sample was not "scientific" either in its selection which had a "bias toward the professional and managerial classes" or its size (30 people in Boston, 15 each in Jersey City and Los Angeles).

13. With all these qualifications one must not lose sight of the fact that this is a pioneering effort. Its subject is a wonderful one, and a matter of growing interest to a widening circle. Do most people consciously look at their cities at all? If not why not? What is the image of a city and does it bear any relation to statistical facts? What are the delights of a city and do these present a dichotomy between what our eyes enjoy and what our mind considers "good"? Is our society prepared to measure the first except in terms of the second?

14. Such questions are not posed in this book, which is still acknowledgedly at the beginning of the study of urban form, and even though it may appear that a mountain of research and endeavour has given birth to a mouse, even a mouse is something, and mice are renowned for their powers of propagation. Perhaps the next book, or the one after that, may present a signigicant image of the city, rather than require that it should be easy to map.

Abstracted from "Daedalus"
Winter, 1961. Pages 147-165.

NOTES ON EXPRESSION AND COMMUNICATION IN THE CITYSCAPE

Gyorgy Kepes

1. Gyorgy Kepes is a painter and designer who is professor of visual design at the Massachusetts Institute of Technology. He also took part in their research study of the perceptual form of the city, sponsored by the Rockefeller Foundation.

2. Juxtaposition of Symbols. In the visual field, particularly in the successive images that we perceive in our environment, the juxtaposition of images offers the most potent symbolic qualities. The contrast of the towering cathedral with the cluster of small dwellings in a medieval city had a symbolic quality. In some of the great cities of the Near East, the bleak, undifferentiated long span of the desert, offset by the flamboyant richness of the clustered buildings, represent more than simple expressions of variety. Contemporary urban dwellers living in a restrained, almost inhuman, setting usually welcome every sign of the natural world that can be introduced. Central Park is more than a pleasant means for escaping the busyness of the city; in its juxtaposition with a surrounding frame of high buildings it is a symbol of the richness and strength of metropolitan existence. Awareness of the power and meaning of contrasting forms is necessary if we are to guide the shaping of a rich poetic city. In the intricate and numerous visual-sequence relationships that the city offers its population, meanings are conveyed in accordance with the structure of the sequence path that we follow.

3. We read the personality of a man through observing the sequence of his expressions and actions. We read the character of the cityscape in the same way. In the complex production processes of our civilization, the division of labor and the physical stability of the work place bring about a relative fixation of the individual in the group. His mobility is a highly limited one. From home to work, from work to home, from home to shopping, the individual follows a defined path at a specified time. Each path of travel offers its characteristic challenge. The basic unit of our urban vision, accordingly, is not the fixed spatial location but the transportation-defined pattern of a sequence of vistas.

4. It is evident that without a major restructuring of the environment this chain of images cannot be modulated. But an analysis of their impacts can bring significant understanding and, possibly, tools for shaping and controlling parts of the environment. An awareness of the qualities of meaning evoked in the spectator by certain sequence relations of morphological elements would help him to develop the sensitivity necessary for forming sound judgments. There is a potential new keyboard of creative formation that can be understood with the aid of technical tools, such as motion pictures, and it may be used with increasing scope. A careful survey of the relationships of form elements in succession is the necessary beginning.

Sequential relations of open and closed space, high and low buildings, rich or simple surfaces, natural features and man-created forms, and the many other variables, can be studied, recorded, and manipulated in order to gain some feeling for the expressive qualities inherent in the justaposed features in the sequence chain. Regular and irregular changes, rhythmical or contrapuntal sequences of different space distances, have to be recorded and interpreted. The range is too vast to be brought down to experimental testing, but there are means for helping us to understand these processes.

5. Because of the enlarged scale and increased complexity of the metropolitan environment, one central core as an expression of civic connectedness is insufficient for all purposes. There is an increasing interredlatedness of the whole urban field.

6. The exploded space of the metropolis in which effective distance depends upon the mode of travel and in which vast areas and populations become linked in a single urban fabric makes the unit building or unit area a less important symbol than in the past. We must find contemporary substitutes and expressive symbols of these new dynamic dimensions. This is especially difficult when the parts of the city are unclear; often today, when one drives in from a suburban residential area to the working center of a city, the sequence of scenes is chaotic, its connecting links are lost, and its symbolic significance is stillborn. What is actually expressed is chaotic, haphazard growth. Sharp accents signifying character changes between two areas give legibility and underline the structural logic of the total urban scene. The heights of buildings, open or closed spaces, changing color schemes, or the alternation of intense, vibrating shopping areas and disciplined public squares can express meaning in and through their connections.

7. A new art form of our century is the collage, a device by which materials from the most heterogeneous fields are brought into a contrasting but complementing ensemble. The cityscape is to some degree a counterpart of the collage, in which the contrast and variety of the elements produces a vitality through tension and the potential of structure. Through the cooperation of architects, designers, painters, and sculptors skilled in the expressive nature of forms, a wealth of new architectural devices, color, and textural values can be brought into play. We must learn to make every building expressive, not just by its material and structural principles, but by the nature of the life it serves. Secure on this level of small units, the next step would be to group the buildings where the spatial relations with each other and with the ground could form a broader scale of differentiation by means of a common spirit. The individuality of a building should cooperate with the expressive form of a group of buildings.

This expressive articulation of the cityscape can be expanded to include districts, areas, and sections. By defining characteristic features, the variety that exists latently can be made manifest. Redirecting interest toward differentiation would inevitably bring qualities of visual distinction to the fore.

8. Articulating the City: The Process. Every process of high-level schematization follows this sequence.

a. The introduction of stress into an unstructured field yields a pattern.

b. Component units of the pattern are read through the establishment of their boundaries; we become aware of the parts of the structure.

c. The relation of the parts is read through the determination of the links between them.

d. The structure itself is read through integrating the parts in their relation.

9. We bring the symbolic structure of the urban environment into legibility according to the following sequence.

a. From the perceptual field of the urban environment we resolve such units as houses, streets, squares, neighborhoods, sections, according to our grasp of the individuality of their features.

b. We read the boundaries -- rivers, walls, gaps, changes of form or expression -- that define these units. Thus we become aware of the parts of the city structure.

c. We read the relation of the parts in terms of their bonds and links -- on the one hand, the traffic arteries and rail and transit lines that collect and distribute the life blood of the city; on the other, doors windows, bridges, tunnels, and long inclusive vistas.

d. The parts in their relation are read together as a common structure -- the symbolic form, the intrinsic symbol of the urban whole.

10. The "New-Yorkness" of New York is due largely to the exciting variety of its constituent areas. Fifth Avenue, Central Park, the United Nations building, Harlem, Greenwich Village, the East River, Wall Street, etc., together make up what we perceive as New York, the city. In our imagination we may toy with the idea of leaving out one or another of these areas, thus changing the composite character of New York. To test our sense of

the wholeness of the city, we may carry the game further and in our imagination gradually delete a series of successive parts. It soon becomes evident that eliminating certain parts of New York implies not only a change of size but a change of character. If we played the same game with a city like Los Angeles, whose parts are less differentiated, the deletion of some of them would mean more of a change in size than character. We may carry on this imaginary game in another direction: instead of leaving out parts, we can try relocating them. We will inevitably discover a certain logic of growth expressed by the present structural configuration. Evidently, the variety of characteristic areas is an integral part of New York. The boundaries between one and another region are consequent and belong to its structural expressiveness.

11. Articulating the City: The Connections. The door, the window, or any opening between enclosed spatial units is an index to the freedom of movement possible on the actual physical level, to the freedom of the eye to wander on the visual level. There are numerous devices men have discovered or invented that bridge separate, bounded, spatial regions.

12. The window or the door has another important feature as well: it can be regulated, that is, it can be part of the fence or barrier when it is closed, or it can function on its own terms when it acts as an opening. The height, the width, the strength, the degree of opening are also indexes of the opportunities for freedom of traffic. The link or path between spatially defined areas helps to articulate a spatial continuum. This may be an extended door or window providing a direct transition from one place to another; it may be an extended transition actually incorporating spatial areas. Roads, bridges, tunnels, air routes, river paths, subways, overpasses, underpasses, rotaries, or cloverleafs are such patterns; they connect regions by concentrating and distributing traffic. Utilities and communications have corresponding distribution paths; power lines, water pipes, telegraph and telephone lines, radio and television channels. Here again, the visible features are the indexes of certain actual or potential events in transportation or communication. They may have a wide range of spatial configuration in different geometries.

13. This semi-fusion of two distinct spatial atmospheres is justified for many reasons. As technical knowledge enabled the production of buildings with thermal and illumination control, the old heavy-masonry protective walls became unnecessary in order to give a feeling of shelter. On the other hand, as the increasingly mechanized world isolated us from the rich fluctuation of the organic world, the psychological need arose to borrow as much as possible from nature to make urban life acceptable. Here again, the structural combinations of the space areas, with their defining or connecting devices, are characteristic of the needs, attitudes, and values of contemporary man. In the broader urban pattern, similar needs may be

recognized. The city is no longer an enclosed territory with walls to protect it from an outside enemy. It is a spatial pattern that needs to fight against the internal enemy of complete isolation from fresh air, sunshine, and open space. Boundaries, connecting links, and openings are being structured in a new pattern. This structure is again a symbolic form expressing certain emerging, values.

14. Traffic and Symbolic Form. Traffic is a major battleground of the city's struggle to preserve itself as a place where the human life within it may continue to exist, to grow, and to encompass its organic and symbolic ends. Traffic and the parking of vehicles are a factor of confusion in our attempts to articulate the city form.

15. We have, however, little historic guidance for relating static space forms, such as buildings, with today's fast moving vehicles of transportation. Problems arise at many levels. First of all, the aggressive dynamics must be balanced by the larger stable world. It would also seem that there is an incompatible contrast between the forms of buildings and of cars. This is most apparent whenever the cars are stationary and blur the perceptual ordering of architectural relationships. Herein lies one of the most serious esthetic bottlenecks of the urban scene. In motion cars tend to blend into a kaleidoscopic stream that, in an esthetic sense, can accent the nature or the surrounding buildings. Standing, they at best compete with and in most cases suffocate their surroundings.

16. Aside from functional needs, the esthetic handicap alone is serious enough to demand our attention. Few of the innumerable parking solutions take this factor into consideration. Although fringe parking alleviates the downtown traffic press, it takes unpleasant visual forms in the important connecting areas between downtown and the main body of the city. The problem of desk-side parking facilities for new office buildings, theaters, hospitals, and stores will be fully solved only when the esthetic aspect is controlled. The filling station is a similar problem. Though its gaudy, attention-catching "acrobatic" devices are justified in a sense by the necessity of attracting the fast moving eye, it too, must find a proper relation with its background.

17. Both problems demand a new structural solution, common denominators that can reduce their complexity into controllable terms. A possible starting point is to eliminate all unnecessary redundancy in an attempt to simplify a codification of the elements. This need is already self-evident in advertising. This system of codification has two interdependent objectives: to be functionally efficient and esthetically satisfactory. Both goals are important in a broader context, for they must be related to and fit in with their surroundings. There is no rigidly fixed code one can use, for the underlying objecting in designing an efficient communication system is to make it an esthetically pleasing, vital form with flexibility and susceptibility to change.

18. Light. Today, the visual manifestations of the urban world are greatly modified through the use of artificial light. Spatial forms and their interrelations are overlaid with a different type of pattern because of illumination at night, and the city has more than ever a double life. Both the problem of orientation and the problems of continuity are fundamentally transformed when day changes to night. Cues that are legible in the daytime become largely useless at night. Forms, colors, and distances that by day may have a satisfactory esthetic configuration are considerably transformed by the lights, which usually have little to do with the form relationships of the daylight hours.

19. What has been said previously about the periodicity between orderly and random patterning holds true here as well. The major poles in this context are darkness and light. It is a commonplace experience to have a strong response when moving from a dark unlit side street to a gaudy theater district. But there are innumerable gradations of experience between these two extremes. The utilization of such qualities of experience as such transitions evoke could create a new type of patterning of the urban night scene. The contrast and transition gained by regulating the brightness of illumination and locating light sources through varying their heights and intervals could give both articulation and enrichment. A focused source of light, such as a candle, a lamp, or a fireplace, generates a focused attention, almost a feeling of warmth or nesting. Our interests are so function-centered that such emotional use of light is rarely given thought. There is a growing interest in developing a new meaning and a new form to city cores. A carefully devised ordering of light could become an important tool in drawing people together in certain areas.

20. The utilitization of climatic changes in the surrounding world belongs to this area of thinking. It is evident that the cityscape undergoes major transformations during the day through the changing patterns of light and shadow. In our speed-obsessed, fast-growing cities, there is little use of the important factor of shadow change. Here again, the consciously planned act has little value, but a careful analysis of the esthetic implications of changing shadows in certain significant areas could help plot changes that are in tune with the richness inherent in the relationship of light, shadow, and form.

21. Texture and Rhythm. We have found that periodicity is an important factor in the perceptual structuring of our visual environment. Complex scenes, high buildings, high-intensity and low-intensity lighting, closed and open spaces are elements that recur. The recurrence of visual features in a structured sequence produces a textural rhythm that facilitates perceptual unification of the form of the city.

22. Abrupt change and gradual change are the two basic units of periodic modulation. For example, the angles of streets may change in unison, bringing rhythmic order. Similarly, a gradual diminution or increase of the height of buildings, the width of streets, and the flow of traffic organizes a directional structure.

23. Total regularity is taxing to the human organism and has functional as well as esthetic shortcomings. Initial steps in planning parkways (abandoned in the current design of throughways) endeavoured to avoid changes in direction, to adjust speed to a constant rate, and to frame the roadway with standardized buildings and landscaping. The monotony of a long trip over one of these turnpikes is not only psychologically displeasing but dangerous as well. The urban environment, on the other hand, suffers more from the dangers of over-complexity than from those of monotony.

24. Textures as qualities of living surface are significant in the rhythmic structuring of the cityscape. In a complex environment like ours, the architectural spatial order is becoming less and less dominant and the textural play of buildings in sequence increasingly noticeable. To bring the vibrating, changing surfaces into a perceivable order, certain regularities among them have to be emphasized. One is the grain or density; another is the inherent direction. In the esthetic organization of the urban scene, both aspects of texture can be utilized. Regular changes from finely to coarsely grained surface textures bring their own type of order. The direction of textural qualities can best be illustrated by simple examples. When seen from a distance, roof patterns whether made from tile or shingle vary in their apparent directional alignment according to the movement of the eye, thus producing an oscillating surface texture. A tree whose leaves are wavering before a brick wall shows two textural surfaces, different both in grain and in mobility. The flutter of the leaves is important to the esthetic quality perceived.

25. In the total pattern of perception, both clear and distorted vision are esthetically important. A continuous chain of clear information may force us to break our attention if it does not give the necessary periodicity to the process of perception. Without the succession of activity and repose in our perception, the scene would be so dense with information that it would lie beyond our grasp. A world made continually illegible by overcomplexity or an extreme speed of impacts strains and irritates the observer. Artistic forms employ a periodicity of order and disorder to build up a total continuity through the proper sequence of these relationships.

26. In the urban scene, the sequences of a consciously planned pattern are impossible, but a modification of extremes and a timing of certain aspects of the poles of order and disorder could be accomplished. For instance, the monotony of a regularly patterned city space can be interrupted by a condensed shopping area, full of variety and extreme in complexity and tempo. Conversely, the complex dense atmosphere of some urban centers can be broken by small squares of patterned landscape. It will require an increased sensibility to make such conscious changes.

27. In its processes of growth, the city goes through these phases of unstructured randomness and patterned orderliness. Only after a certain stage of structuring and activity does it become necessary to interconnect them in a planned logical fashion. After reaching the ordered stage, the city will branch out again in new directions of growth, introducing uncontrolled vistas, full of challenge and complexity. By clearly understanding the interconnection between city growth and our perceptual processes we may find some guiding principles for regulating the evolution of the city.

Abstracted from "Landscape Architecture"
Volume 51, Number 1, Fall 1960, Pages 43-46

ECOLOGY OF CITIES

Karl Linn

1. Karl Linn is Assistant Professor in the Graduate Department of Landscape Architecture, School of Fine Arts, University of Pennsylvania. He calls for an approach of "human ecology" as well as "plant ecology" of landscape architects. He then discusses the possible contribution of landscape architects to the planners of the cities that will be inhabited by the man of tomorrow.

2. The Accessible Landscape. We must first take inventory of the wide-open landscape. Is it accessible or inaccessible to the people? New Yorkers, who are divorced from their larger landscape by a girdling suburban sprawl, need their Central Park as the only space in which they can sense the impact of undiluted, untamed open space. But in addition to such a park, they need a multitude of intimate spaces throughout the city, easily accessible, spread around in such a way that they can be reached by people on the routes of their daily endeavors.

3. In addition to a sense of terrestrial place - a social, cultural, rootedness and identity - man needs to be rooted in the cosmic space. The Japanese garden designers with limited space at their disposal make use of the trees of their neighbors and of the mountains beyond and accordingly re-establish the cosmic context of their gardens. So also they re-establish the cosmic contact of man. Their deftness in manipulating depth perspective is directed to this same goal. If the larger landscape is inaccessible in most cities, if the surging oceans are lacking, in addition to gregarious spaces for the teeming urbanites, cities have to provide untamed, powerful, open spaces where one can be alone under the dome of stars, feeling infinitesimal and mighty at the same time.

4. Appropriate and Inappropriate Space. Urban space is at such premium that we cannot afford to waste it. Still, a curious void has been created in our social existence. People are crammed onto sidewalks to escape the hazards of vehicular traffic, crammed in subways, rushed and ushered along all day with no opportunity to pause, to take a deep breath, to get hold of themselves, to look into somebody's eyes, to talk to someone in their own right. They are given squares, plazas, and shopping malls where they are invited to sit on cold concrete benches without back supports (the benches always facing away from each other), where pavements (no matter how textured) are exposed to the glaring sun; spaces where appreciation, yes, even contemplation of the intricate balance of asymetrically-placed elements is requested of a weary public. Certainly we need our contemplative sculpture gardens, but let us not put them in shopping

centers. Instead of being made self conscious in these self-consciously designed squares, people need modest, humble, and unassuming areas where the space envelope can be sensed but does not have to be focused upon.

5. Consistent with this thinking, we should scrutinize spaces with all our critical faculties to determine to what extent they are created for people, for the fullest development of their potentials, and for the universal man, who shares his hopes, his sorrows, his loves, and yearnings with people all over the globe. We should determine to what extent these spaces are designed for the family of man -- and to what extent for man only as a consumer.

6. Noise as Environment. As an ecological environmentalist, I can think of no more urgent appeal to the technical genius of America than for sound control -- by which I mean Control of Sound. The music in lobbies, elevators, and shopping malls is one of the most insidious intrusions into the privacy of man. It is part of an enforced subliminal regimentation. It renders people helpless, forced to sway with the superficial Kaffeklatsch harmonies, to become dulled into unawareness and, presumably, to buy things they do not need.

7. We give too little though to the elimination of noise, or to its impact on design. The Franklin D. Roosevelt memorial in Washington is an example. Every minute an airplane from the nearby airport shoots over the area. Despite the fact that there is some evidence that real-estate values have increased around some airports, this doesn't necessarily mean that people can peacefully survive in sanity when exposed to such shattering noise.

8. Domain of Landscape Architecture

a. Canopies of foliage lined along the streets and avenues are the most effective means. To relieve the city dweller of the heavy weight of towering buildings which he shoulders. The significance of street-tree planting from the point of view of air purification should by no means be underestimated.

b. In drab and lifeless concrete canyons where the change of seasons throughout the year is not experienced in a continuity of gradual transitions -- vibrantly colorful displays of seasonal flowers are valuable.

c. Gardens of apartment-house courts have the additional task of providing visual interest for tenants living above them in elevated apartments where the important contact with the garden is aerial perspective.

9. Particular Problems of Urban Planting

a. City conditions at best constitute unnatural, if not difficult, conditions for survival and growth of plants. Air pollution, heat reflection, lack of air circulation, insufficient and unreliable light, lack of relative humidity, cooling winds, and, in many instances, artificial depth of soil (as in gardens built on structures) weaken plants and render them susceptible to disease and insects.

b. There is in each city an infinitely greater variety in the environment than is found in the natural landscape.

c. The selection of plant material appropriate to city conditions is therefore much reduced, and landscape architects must be careful in their choice. Because of the limited size of urban spaces, people want to enjoy their plants the year round. Narrow planting areas around buildings will necessitate the emphasis of plant silhouette rather than mass.

d. Maintenance must be meticulous: frequent hosing of foliage to remove dust and soot must be accomplished along with all other horticultural practices must be conscientiously followed.

e. Artificial light of plantings should be cautiously handled, for many plants can be severely damaged even by small intensities of illumination in their dormant periods.

f. Plant containers and tubs above ground level are exposed to extreme fluctuations of temperature, which curtails the life of plants and it is advisable wherever possible to have beds sunken.

Abstracted from "The Architectural Review"
December, 1960. Volume CXXVIII Number 766.
Pages 407-416. Illustrations.

ROAD-STYLE ON THE MOTORWAY: THE SERVICE-AREA PROBLEM

Raymond Spurrier

1. The limited access highway cannot be considered in isolation. It is not just a track for motorists; it is an all-embracing, all-penetrating network which together with the vehicles on it, the signs, the bridges, and the roadside ancillaries -- whether we like it or not -- is an integral part of our life and landscape. Other forms of transportation have evolved an acceptable, aesthetic which has grown out of their own particular functions; as a result, they manage to be compatible with their surroundings. It is the motor habit which has wrought most havoc with the environment -- no doubt because it has hitherto been a footloose kind of activity. That was its early attraction: the open road, go where you like, stop where you like and when you like; not more fixed points of embarkation, no terminus. And as a long-term result, nowhere to go because of universal subtopia and nowhere to park when you get there. And so we are becoming increasingly aware of the need for a stronger discipline -- the town and country planning discipline of recrystallizing a fragmented environment into a more logical, organized pattern with its related buildings and open spaces sorted out in sensible contradistinction.

2. Siting Servicing Areas along Motorways: Under this heading come the basic decision of how far apart these servicing areas should be and also their relationship with the normal road network and nearby settlements; the relationship with the landscape and its contents, e.g. houses and their neighborhood boundaries, hills and valleys, woods and open country.

3. What might be termed development requirements include:

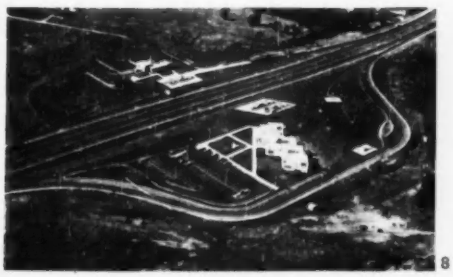
   a. ease of acquisition,
   b. availability of main services,
   c. physical characteristics,
   d. suitability of contours.

The recreational facilities of the lakeside obviously governed the choice of the site in fig. 7 whereas the arrangement in 14 depends on the road being in a cutting, although one feels here that things have been done backwards: an artificial cutting has been contrived to bolster up a preconceived design.

service areas

7

7, lakeside service area at Bad Reichenau on the Chiemsee (Munich-Austria Autobahn). Though a special case, this shows how the siting and design of a service area can exploit, even enhance, its natural setting. Something more positive than simply fitting-in may frequently be required.

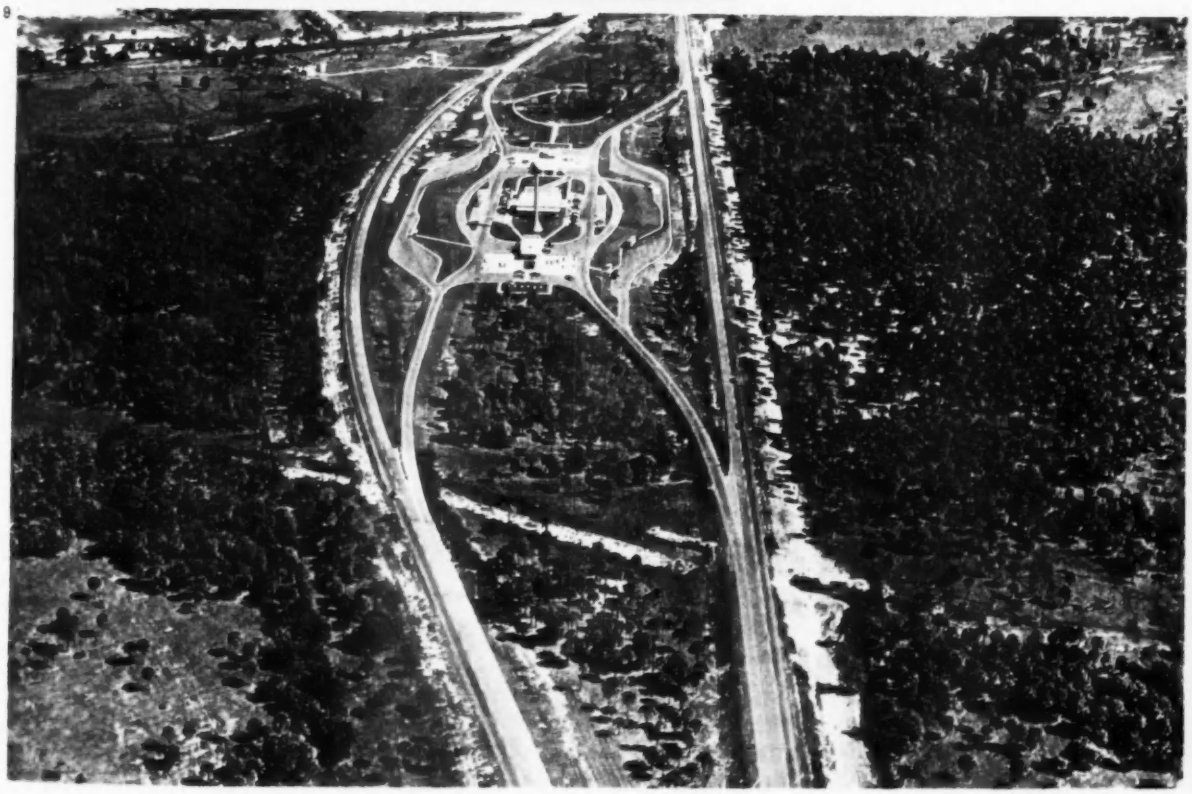


8

8, an uninspired and inadequately landscaped service area on the Connecticut turnpike—ill-defined in form, exposed, and smudged off into its surroundings.

9, Pompano service area on the Sunshine State Parkway, Florida. The centrally placed service area becomes a major feature, because at least one carriageway will have to be curved around it, but this is service area design on a grand scale—another example from the same highway, giving an idea of the architecture and detailing involved, is seen in 19, *p.* 416.

9



4. Arrangement of the Service Area. Despite the rigid limiting factor of an unbreachable centre reservation facilities can be arranged in a number of ways without interrupting the free flow of twin carriageways. These illustrated diagrammatically on opposite page are:

a. twin area, each self-contained,

b. staggered areas, each self-contained. The pros and cons of each of these seem fairly evenly balanced: (b) is a smaller unit to absorb in the landscape and makes for easier siting, but if some disamenity is going to be caused it might as well be concentrated in type (a) and thus more widely spaced. If the two halves of type (a) are run by the same operator some connecting link is desirable in the form of at least a pedestrian bridge or tunnel. This suggests:

c.. which is a twin area sharing one restaurant

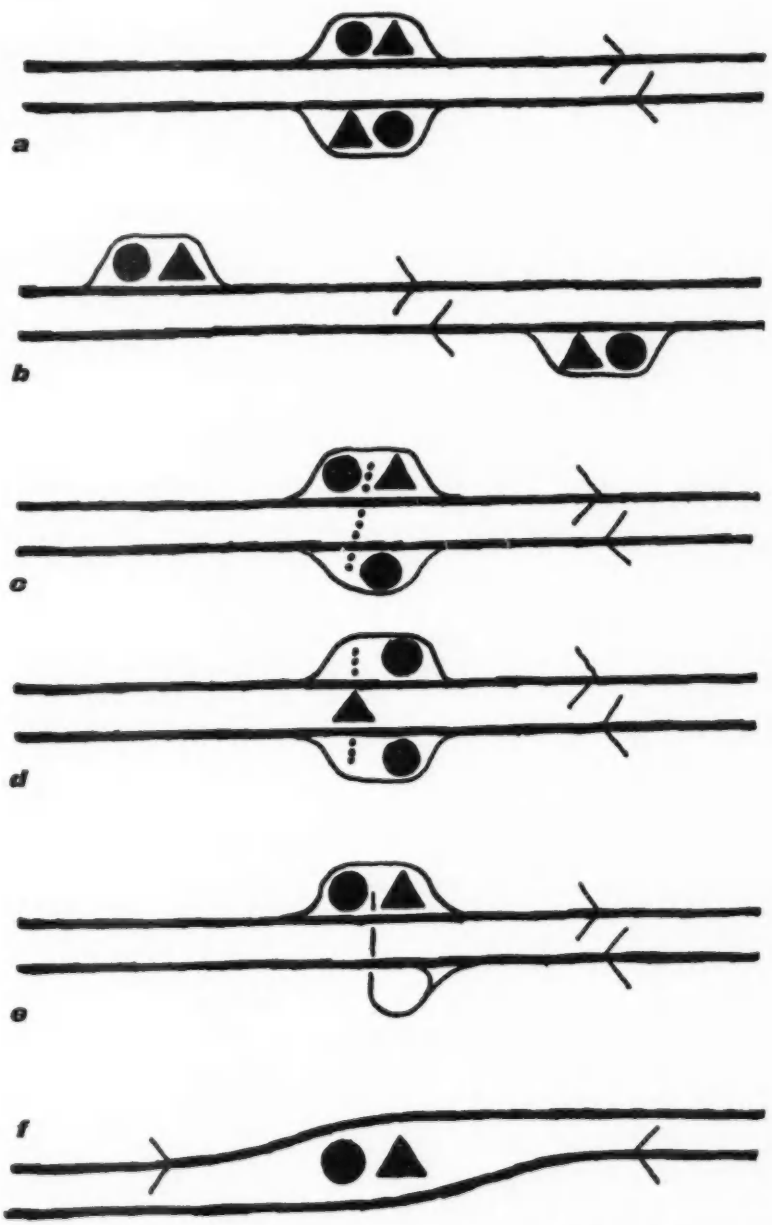
d. is virtually the same as type (c) but here the footbridge serves double duty as restaurant. (Illustrations page 223).

e. One single area on one side only reached from the other by bridge or tunnel. Against the obvious advantages must be offset the cost of land and construction for link roads which nevertheless, if cunningly designed, could serve a useful purpose in the process of deceleration.

f. One single area between carriageways. This seems on the face of it the best method of all. It allows an economic grouping of buildings and services, obviates the need for structures bridging the road, gives scope for unified design; the installation is kept within the confines of the highway limits by being in effect part of the central reservation, specially widened for the occasion. There need therefore be less adverse impact on surrounding land. It would be ideal on a motorway properly designed with each contour-hugging carriageway independently aligned. The only snag seems to be that access lanes must run off the offside (fast) lanes of each carriageway although this is something we could get used to. (See illustration, page 219).

5. Layout of Service Areas. This refers to ground plan and circulation within the service area. It must pay regard to the needs of the operator, who will expect easy working and economic maintenance, and those of the motorist, who will expect quick service, convenience, and a logical sequence so that he will find himself in the place he wants to be. A few obvious points are: a decent view from the restaurant, separation of motor smells from kitchens and dining areas, segregation of pedestrian traffic from vehicular manoeuvring, adequate room to manoeuvre but no deserts of tarmac (8) and separation of lorry and bus parking areas from the private car park.

10, *variants of basic service area plans; a, symmetrical; b, staggered—for traffic flow or landscape reasons, the stagger might be a matter of miles; c, asymmetrical, with footbridge.*



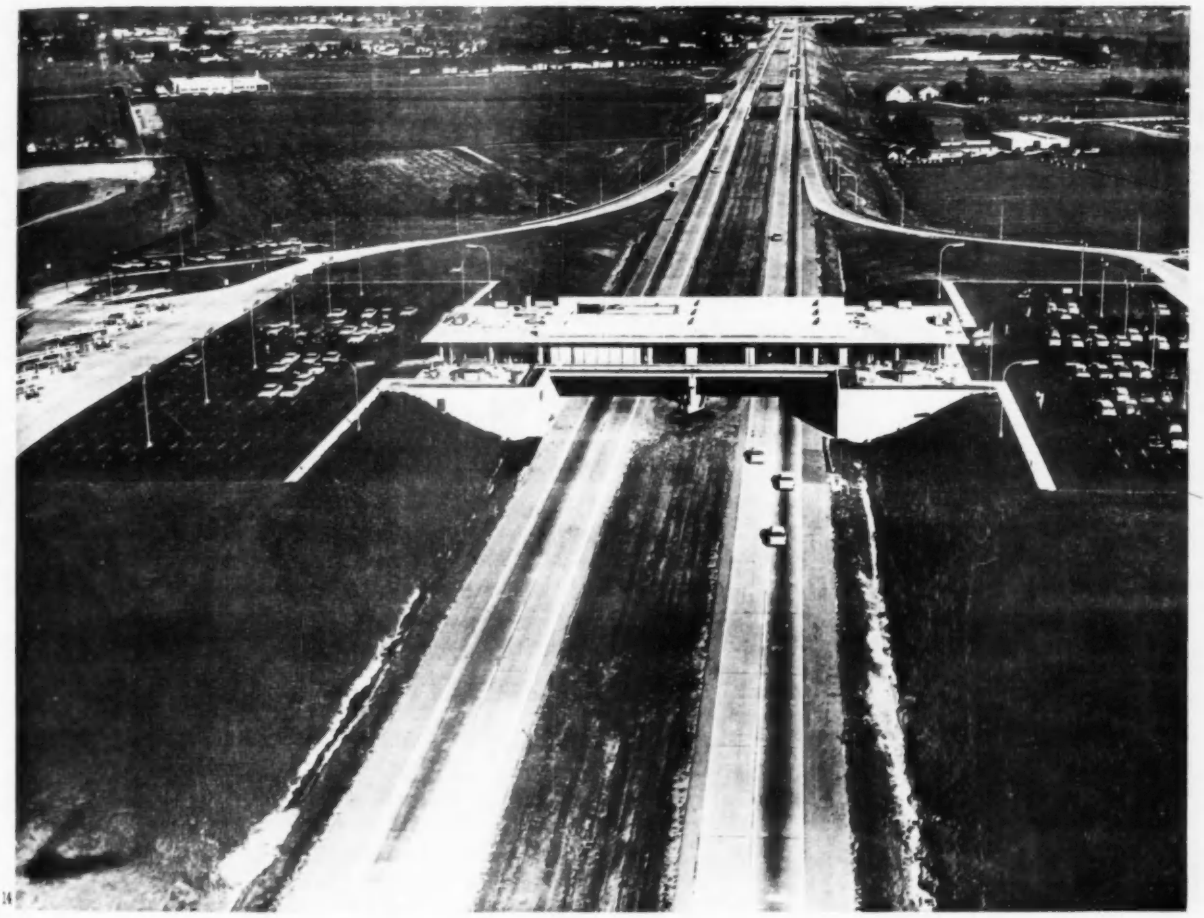
11, *further planning variants: d, with restaurant on footbridge; e, with car tunnel under main carriageways—an expensive solution except where land-form reduces the amount of earth-shifting; f, centre island.*

6. Design of Service Areas. The items already listed determine what sort of an element in the landscape the service area will become even before it is designed in detail. The architecture of the place, right down to the design and placing, colour and texture of signs, oil cans, pumps, fences, lighting, paving, and the assimilation of the parked vehicles, will influence to a considerable extent the efficiency of the services and the pleasure in using the area. As the motorway network spreads, journeys become longer and service areas become the only link with life that the traveller can enjoy without leaving the system. They therefore have to take the place of the towns and villages that hitherto provided contrast, relief, shelter, refreshment, and change of scale. Psychologically, and perhaps physically as well, their effect could be much the same as that formerly experienced at a staging inn after a blustery day on top of a horse drawn coach. There is an opportunity to climb down from the cinerama views and get back to the human scale for an interval.

7. The first problem is therefore one of adjustment -- how to reduce speed and scale. Deceleration lanes are provided but something more effective than a GO SLOW signs are needed for reducing from 80 m.p.h. The next need is to be shown where each component part of the service area lies without recourse to a multitude of signs. The self-revealing layout, where alternatives are presented in sequence, is likely to be the most effective. Refuelling should be a simple in and out process; anyone wanting more should find himself at the car park and then proceed on foot to other facilities -- and it should be clear from the design, which is motorist, and which pedestrian, territory.

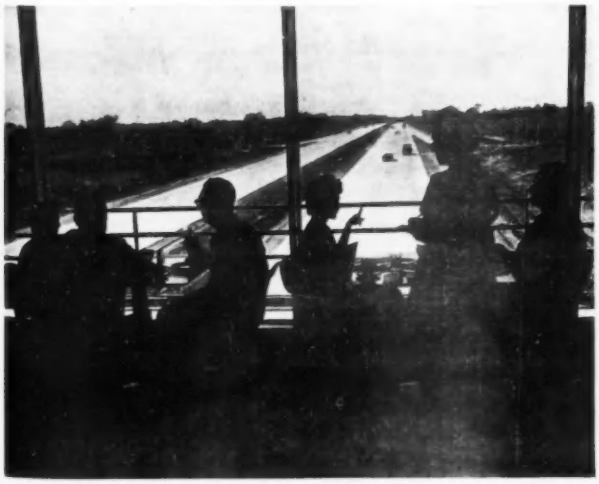
8. Parking is a major architectural problem. The military camouflage method of dispersal under trees (a genuine car "park") is suitable for picnic areas, but for the more conventional parking lot some other method of disguise is necessary. Earth banks might be one solution, depending on site contours; or a simple bold pattern of rail fences, etc., can unite many elements. Having left his vehicle where he can find it again, the driver and his passengers will need to be led on to the other facilities and the art of townscape needs harnessing to this simple task if there is to be any enjoyment from the stop.

9. Service areas are placed alongside motorways. They are also placed in the countryside. To which do they belong? The thatched garage of the thirties was presumably an attempt to belong to the countryside. The road too -- any road, including a motorway -- ought to "belong". A motorway designed sensitively could both be itself and be embedded in the landscape. A service area could be part of both. It must look right from the road, from the landscape, and from within itself. The whole ensemble must have style -- motorway style. Unfortunately this is something we haven't yet got in the sense that there is a canal style or a nautical style. But service areas, properly conceived, could help to bring such a thing into being.



14, *overbridge restaurant—one of five—on the Illinois Tri-state and Northwest Tollway system. The building itself is commendably simple (contrast* 16 *and* 17, *right) and there is straightforward logic in its planwise relation to the car-parks and filling stations, but the amount of earth-moving involved in creating an artificial cutting in an embanked road, clearly needs exceptional justification.*

15, *view from the interior of a restaurant on the same Tollway system.*



service areas

16, 17, *over-elaborate treatments of the overbridge theme, at Firenzuola,* 16, *on the Autostrada del Sole (an otherwise well laid-out site, see* 13, *opposite) and at Vinita,* 17, *on the Will Rogers Turnpike in Oklahoma—any structure spanning the carriageways should be an incident, not a distraction.*

Abstracted from "The Architect and
Building News" Volume 218/25.
21 December 1960. Pages 797-799.

HOUSING AT DJENAN EL HASAN, ALGERIA

R. Simounet

1. R. Simounet has been the architect for a rehousing project for the city of Algeria. The side of the Djenan El Hasan estate comprises an extremely steep slope of 45 degrees. He was further limited by a budget of 400,000 old francs per dwelling, including site works and planting. (This is about 290 pounds or $825.)

2. A terraced scheme of single self-contained units set on sheltered and ventilated streets gives independence of dwelling to the inhabitants. Set along alleys, the dwellings are linked by stairways passing through public patios. Service roads at right angles to the level curved terraces are all in the form of stairways. There are 210 dwellings on the 1 hectare 20 ares sites (approximately 3 acres). The an average family of 5, the density is 875 persons per hectare (354 persons per acre).

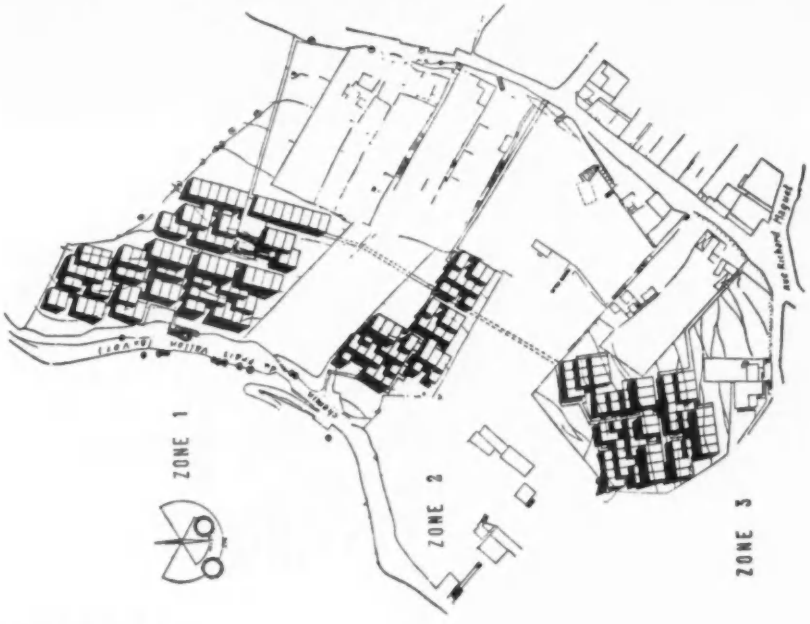
3. Each dwelling is equipped with electricity, water and a w.c. and there are three different types:

a. one room of 133.47 sq. ft. and a loggia with WC of 52.2 sq. ft.

b. a room of 190.44 sq. ft., a shelter with a WC of 52.2 sq. ft. and a garden

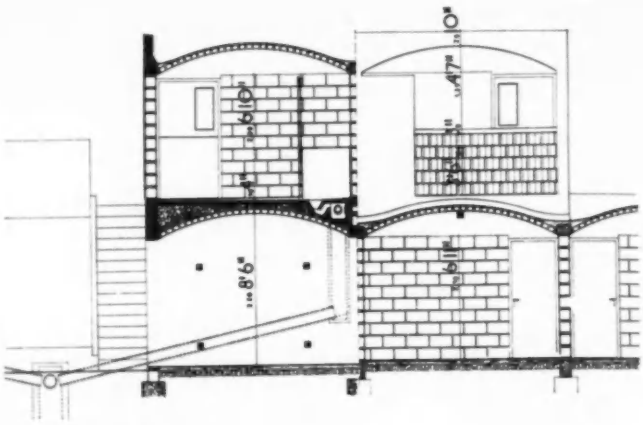
c. two rooms on two floors -- ground floor with one room 133.5 sq. ft. and a loggia WC of 52.2 sq. ft. The upper floor has one room of 190.44 sq. ft.

4. The walls, composed of a concrete aggregate 8 inches thick, give good heat and sound insulation. Floors are of concrete and the roofs are of terracotta, left fairface on the inside. Each building takes the form of a single unit and weather-proofing of the outer walls is by means of white-washing with a waterproof compound.

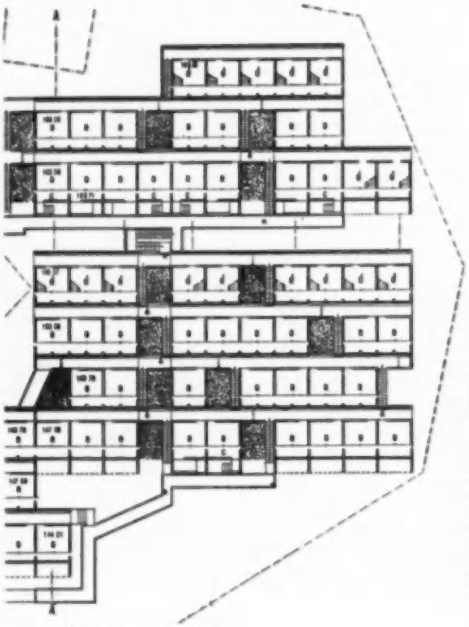


▲ SITE LAYOUT

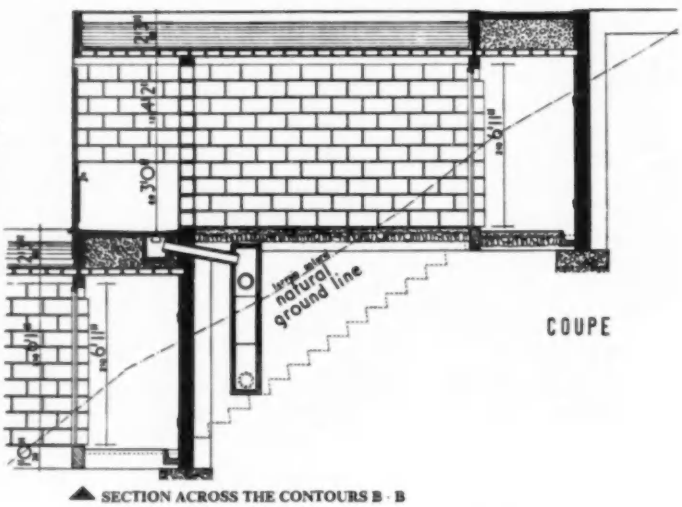
An extremely steep site has enabled the architect to give each 'cell' of living accommodation a clear outlook over lower terraces, giving privacy with a high density of 354 persons to the acre. Plan and section below show a typical group of dwellings. Detail of an individual 'cell' is shown right



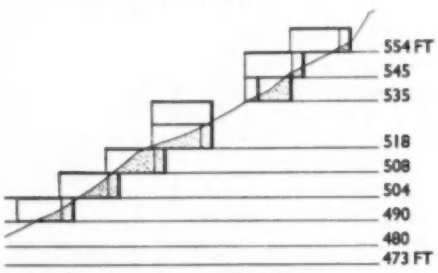
▲ SECTION A - A



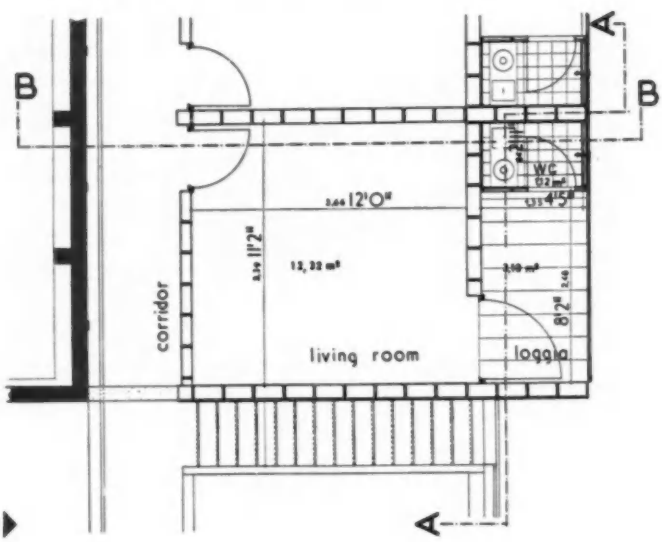
▲ GROUP LAYOUT PLAN



▲ SECTION ACROSS THE CONTOURS B - B



▲ SECTION A - A THROUGH SITE



PLAN ▶

Abstracted from "Cahiers du Centre Scientifique
et Technique du Batiment" No. 46, October, 1960
Pages 1-24.

TIMGAD

1. The Government Delegation "Generale" has decided to build a new town near the ancient ruins of the Roman town Timgad. One of their reasons for the creation of the town in this location was for the protection of the Roman city built by Trajan around 100 B.C. for retired soldiers.

2. Location. The location climatically is extremely suitable for settlement. Although the climate is semi-arid with long periods of dryness, the watershed of the north slope of the Aures mountains soaks the Timgad region. Thus, vegetation covers the entire area encouraging plantations. The site is about 550 kilometers (340 miles) southeast of Algiers. The principal access is through Batna, the prefect's office, 37 kilometers (24 miles) to the West.

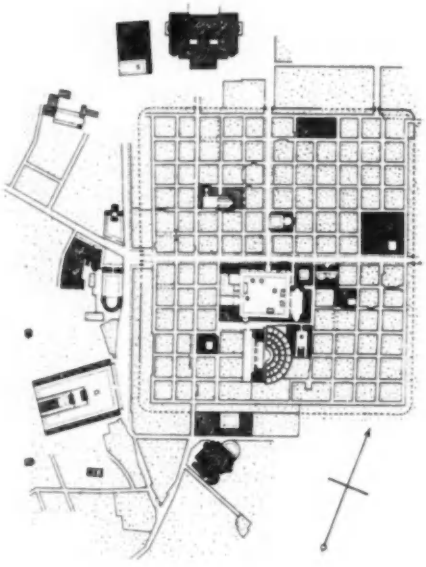
3. New Village of Timgad. In 1956 the first development of the new town was begun without any plan and by 1957 1200 inhabitants occupied the temporary quarters which were built. Then in July 1957 a commission chose a site in accordance with the Inspector of Urbanism for the Central Administration and representatives of Bridges and Highways and the Fine Arts. The plan for the new town was approved on October 30, 1958.

4. The new town of Timgad is being built parallel with and 1000 metres to the north of the ancient city. It includes several types of housing; vertical and horizontal blocks of duplex and semi-urban flats; a business centre and Moorish baths; administrative buildings; town hall, post office, medical centre; a mosque; school and sports facilities; an experimental orchard; communal stables and grain store; and a large hotel. It has been planned with consideration of the climate, local customs, and the existence of the nearby Roman city. It is estimated that the population will be between 2,500 and 3,000.

TIMGAD

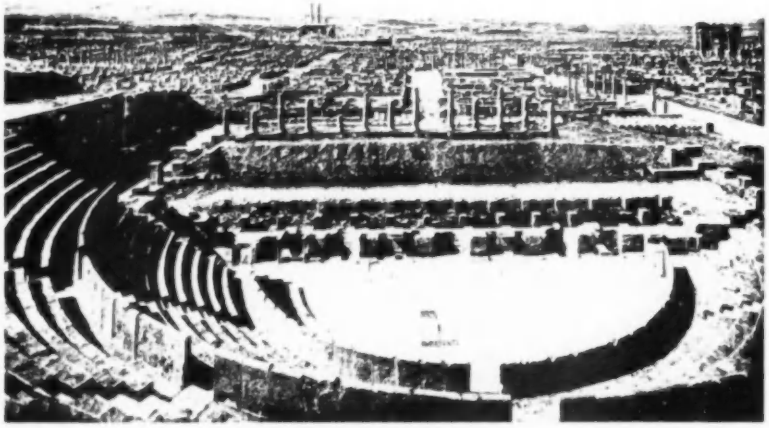
PLAN

From Gerkan, *Griechische Städteanlagen*



BELOW: GENERAL VIEW FROM THE THEATER

Photo Compagnie des Arts Photomécaniques



Plan d'aménagement.

Echelle 1/500

Abstracted from "Interbuild"
November 1960, Volume 7, No. 11.
Pages 16-25. Illustrations

NIGERIA: SHAPE OF THE FUTURE

1. The emergent African territories may provide a testing ground for technologies of town planning and theories of architecture produced by the longer established machine - age cultures of Europe and America, where the crammed cities in which the theories evolved lack the virgin land necessary for their exploitation. The sites exist for a dozen potential Brasilias, and the fierce national pride necessary to promote them is now at its peak and hampered only by wariness at too much financial commitment to outsiders. Nigeria, whose independence this year drew on decades of administrative coaching to avoid the debacle of too sudden a handover, has taken its place as a meeting ground for the best of both worlds -- the pioneering of nationalism achieved and the willingness to draw on a vast source of international expertise.

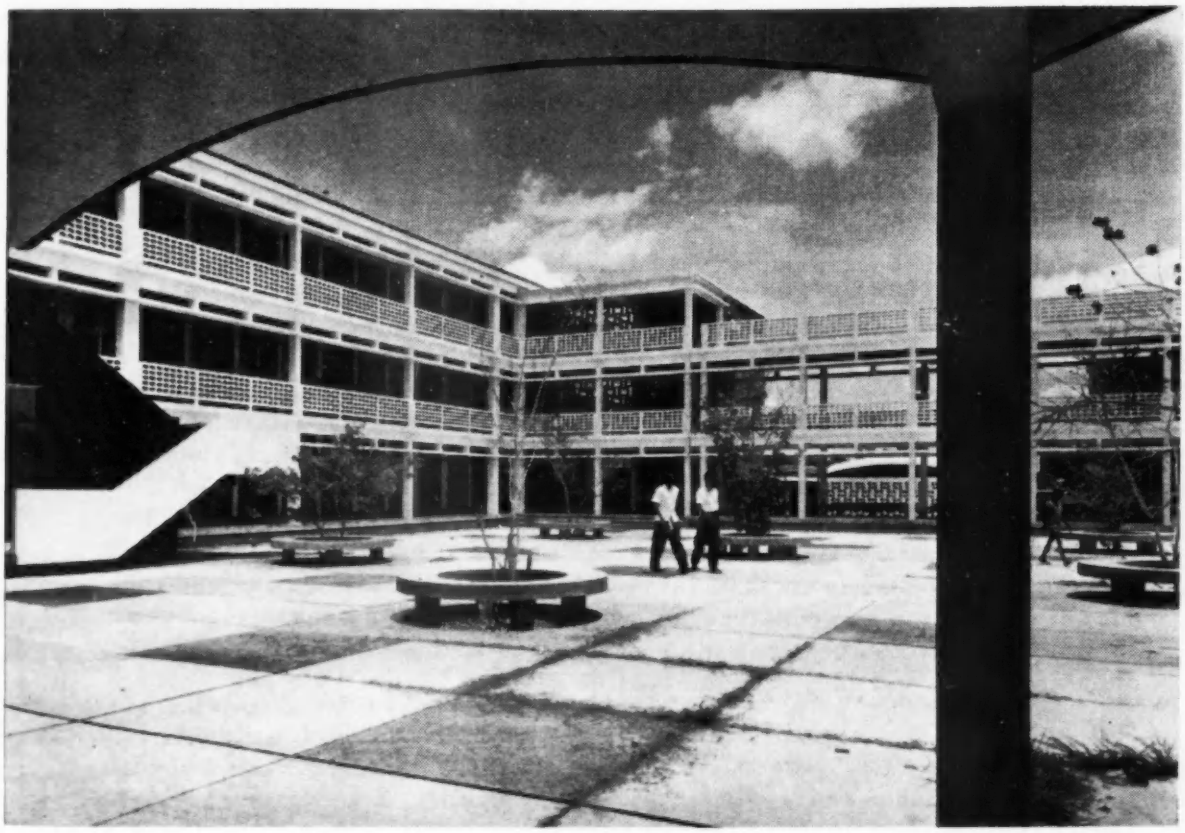
2. Nigeria is 333,169 square miles in area and had an approximate population of 33,850,000 in 1958. The principal cities are Ibadan, 500,000 population; Lagos, 337,000 (capital); Oghomosho, 135,500; and Kano, 130,173. It became an independent nation in October, 1960 and is one of the more recent members of the United Nations.

3. Rules of Thumb. Growth of the country's communities has been based on some strange rules of thumb. Some early settlements date from the greed and infamy of the slave trade; later communities are split down the middle between European and native quarters by an arbitrary belt five hundred yards wide -- as far as a mosquito can fly.

4. Regional Governments administer the country under an overall Federal aegis and tribal groups vary from the completely nomadic to the comparatively sophisticated who prefer to settle in established communities. In the Northern Region there are few large towns apart from Kano, and the people live mainly in villages. This applies also to the Eastern Region, except that the general density of population is higher and the villages are bigger and closer together. In the Western Region, Nigerians tend to congregate in larger units and this region -- with Lagos, the federal capital -- may provide the spearhead of progress in adaptation of western ideas to its modern communities.

5. At present, no Doxiadis seems to have come forward with physical recommendations for the organic community -- though town planning consultants are beginning to establish a basis for future developments. At present, a

The new building in its harbour setting of an older commerce is seen next to Shell House -- designed by Walker, Harwood and Cranswick.



One of West Africa's best known examples of modern architecture, the university of Ibadan by Fry, Drew, Drake and Lasdun.

typical pattern seems to be a large cluster of primitive dwellings among which the prestige offices sprout. One skyscraper begets another, shops and restaurants are added. More highly paid workers, civil servants and the business caste, move to suburbs and a periphery of bungalows grows up, a radial development still separated from the tall buildings of the centre by an infill of mud huts. This is the pattern at the moment, but both federal and regional governments have laudable enthusiams for slum clearance and the application of town planning principles.

6. Development of Lagos. The Western Region for example will spend 12.9 million pounds over the next five years on roads, 2 million pounds on encouraging housing and 2.2 million pounds on town and country planning. This last sum, according to the government spokesman, is justified as follows: The people of the Western Region are principally town dwellers. There are, according to the 1952 census, 135 towns with a population of 5,000 or more. These towns, especially the larger ones such as Ibadan, Ikeja, Oshogbo and Sapele, will continue to expand as the economy grows. The 2 million pounds allocated for town planning will be devoted to providing assistance to local authorities, for the establishment of town planning authorities, for the preparation of schemes and layouts, for the training of staff and for organizing the collection of revenue.

7. In the whole of Lagos and much of the colony province of the Western Region, sites are already subject to town planning control even though land acquisition -- as in the rest of Nigeria -- may be bedevilled by a mass of conflicting titles with their origins in agrarian custom, such as that a distant relative can hold up negotiations by insistence on grazing rights.

8. Lagos itself is a comparatively small island, connected to the mainland by only one bridge and, until recently, it slumbered in the torrid heat. Capital development has been slow but, with the importance of Lagos as a trading port and Federal capital increasing rapidly, vigorous slum clearance and redevelopment schemes have been put in hand. Practically the entire port and residential area at Apapa, opposite the Island, have been reclaimed by sand pumping, as well as large areas on the Island itself, to cope with the demand for residential plots. The Lagos Executive Development Board, charged with the unenviable job of clearing the slums and reconstructing the main arteries of the town, has achieved remarkable success in its Central Area redevelopment scheme, and the dust of demolition and construction still drifts over the area. Vigorous commercial development has also taken place as the demand for high standard office and shop accommodation rises.

Low Cost Housing in Western Nigeria. Two examples at Bodija outside Ibadan are shown, where a 400-acre suburb is expected to house 1,200 families. The houses are of native stone and concrete and range in price from 1,000-3,500 pounds. The design was developed specially for West Africa by a team of United Nations architects and the houses are similar to those already built in the suburbs of Accra. Shown above are the two top price models with, left, the 3,500 house which covers 2,000 square feet on two storeys. The other house is the 1,500 model containing 1,100 square feet. The Housing Corporation makes loans to up to 80 per cent, and already 400,000 pounds has been disbursed in this way. A similar project is under way at Ikeja, 13 miles from Lagos, where the housing project is being integrated with industrial development on UK lines. The Western Nigerian Government has allocated a large sum of its current Five Year Development Plan to assist towards the establishment of town planning authorities, the preparations of schemes and layouts, the training of staff and to organise collection of revenue. A further 2 million pounds has been allocated for rapid urban development. This sum is being used to make loans to Town Planning Authorities or companies to undertake site development where well-planned schemes for selected areas have been worked out, costed and shown capable of yielding an early return on investment.

9. The climate is hot (85 degrees) and humid (70-90% relative humidity) most of the year, with a rainy season of around four months which includes heavy tropical storms and squalls. Buildings need generous sun screening, large roof overhangs and good storm-water drainage. Untreated timber is subject to attack by white ants, steel rusts rapidly unless well protected, colours are bleached out of paints by the sun and the external maintenance of building is an expensive item. Perhaps the biggest advance of all in Lagos is in the air-conditioning field -- though it still lags behind other tropical belt cities such as Singapore. The central plant system is now becoming more normal in large blocks and chilled water system with individual distribution units on each floor is generally considered to be the most economic and effective method. High-velocity systems, though space saving, are still noisy, and difficulties are being experienced in their installation, mainly due to the lack of skilled fitters.

10. Plans for Ibadan. In the Western Region, Ibadan is already well-known in the world of modern architecture for its university -- by Fry, Drew, Drake and Lasdun -- and its growing population is being catered for by some impressive development -- from a progressive lowcost housing scheme to an Olympic standard sports stadium.

11. Ibadan -- whose population varies from 750,000 to one million depending on the agricultural season -- is the largest indigenous city in Africa. To absorb some of the overcrowding from the shanties round the climbing buildings of the city centre, the Akintola government have launched the Bodija development. This began in 1958 and is a 400-acre suburb which will eventually contain more than 1,200 dwellings with a shopping centre, churches, parks and schools. Houses are available at prices of 1,000 pounds, 1,500 pounds and 3,500 pounds, with floor areas of 700, 1,100 and 2,000 square feet. Finance and building are arranged by the housing corporation which has established the minimum monthly salary necessary to determine the eligibility of buyers. This starts at 29 pounds a month for a mortgage on the 1,000 pounds house.

12. Enugu's Growth. Enugu, capital of the Eastern Region of Nigeria, owes its existence to the rich coal seams in the district. During the last few years it became obvious that the expansion of Nigeria's economy would continue to increase the importance of Enugu as an administrative and industrial centre. The present town grew up without much planning and is completely bisected by the railway line which complicates local communications and makes an integrated development of the town difficult. In 1959 a master plan was begun. This provides a central area for the Houses of Assembly and government offices with carefully zoned residential and business districts. Main shopping areas were planned to serve different housing schemes and prevent overcrowding in the centre. Extensive tree planting was planned to divide one zone from another and to shade the streets.

ACCRA-TEMA - AKOSOMBO

REGIONAL PROGRAMME AND PLAN

INTERIM REPORT

Doxiades Associates

INTRODUCTION

1. On the 23rd of March 1960 the Government signed an agreement with Doxiadis Associates regarding the submission of a programme for the development of the Accra-Tema region. This agreement provided for the submission of a study in two phases, i.e., an interim report on the 23rd of August 1960, and a final on the 23rd of January, 1961.

2. The following geographical zones were proposed:

A. The Accra-Tema region, which includes the boundaries of the Metropolitan area.

B. The Accra-Tema-Akosombo triangle referred to in the present report as the study area. It is defined North and South by two problem areas, viz. the Metropolitan area in the South and the Akosombo-Senchi area near the dam, and comprises a chain of small rural centres located along the Accra-Dodowa-Kpong highway at the foot of the mountain with extensions to the East towards the plain.

C. The Accra Plains, i.e. the region defined by the mountains, the Volta River and the sea. This region includes three well-distinquished areas: the lower Volta flood plain, the central plains, and the coastal zone.

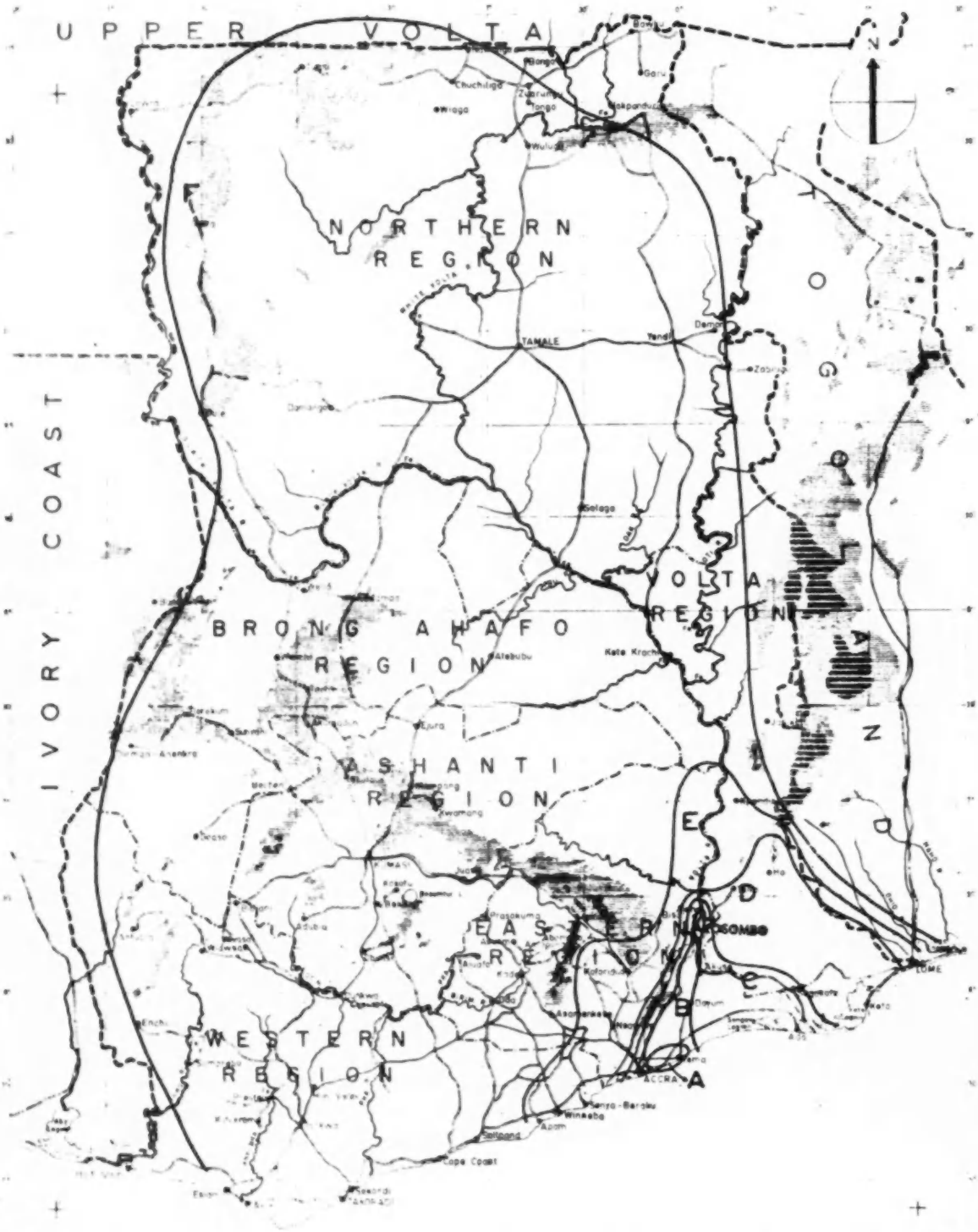
D. The South-East Coastal Plains, i.e. the region southeast of the Akwapim range, which includes the Accra Plains and the Ho-Keta Palins.

E. The greater region of the Volta project, i.e. the region around Akosombo, the port of the future lake, and west and south-west of the Akwapim range down to the coastline.

F. Represents the total area of Ghana.

3. An ekistic survey of the Study Region has been conducted by the consultants in order to understand its regional pattern. In examining this map in relation to the agricultural zones, we shall note complete consistency. The various centres are more thickly laid out in arable areas, they are more spaced out in live-stock breeding areas and are completely absent from black clay areas. In addition to this, we note a greater density of centres along the road arteries as well as along the coast.

PHASES OF APPROXIMATION


UPPER VOLTA
IVORY COAST
NORTHERN REGION
BRONG AHAFO REGION
ASHANTI REGION
EASTERN REGION
WESTERN REGION
VOLTA REGION
TOGO
YAMALE
ACCRA
KUMASI
TAKORADI
SEKONDI
TARKWA
Cape Coast
Winneba
Nsawkaw
Kete Krachi
Salaga
Yendi
Zabzugu
Bawku
Navrongo
Bolgatanga
Wa
Lawra
Tumu
Sunyani
Techiman
Kintampo
Goaso
Bibiani
Axim
Half Assini
Elubo
Enchi
Dunkwa
Swedru
Winneba
Saltpond
Agona
Nsawam
Koforidua
Nkawkaw
Mpraeso
Oda
Asamankese
Begoro
Akim Oda
Kibi
Suhum
Aburi
Nsawkaw
Ho
Kpandu
Hohoe
Jasikan
Kadjebi
Dambai
Kete Krachi
Nkwanta
Yeji
Atebubu
Kintampo
Wenchi
Berekum
Dormaa Ahenkro
Sefwi Wiawso
Bibiani
Enchi
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Elubo
Axim
Tarkwa
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Bekwai
Mampong
Kumasi
Ejura
Sekondi
Takoradi
Cape Coast
Saltpond
Winneba
Nsawam
Aburi
Koforidua
Nkawkaw
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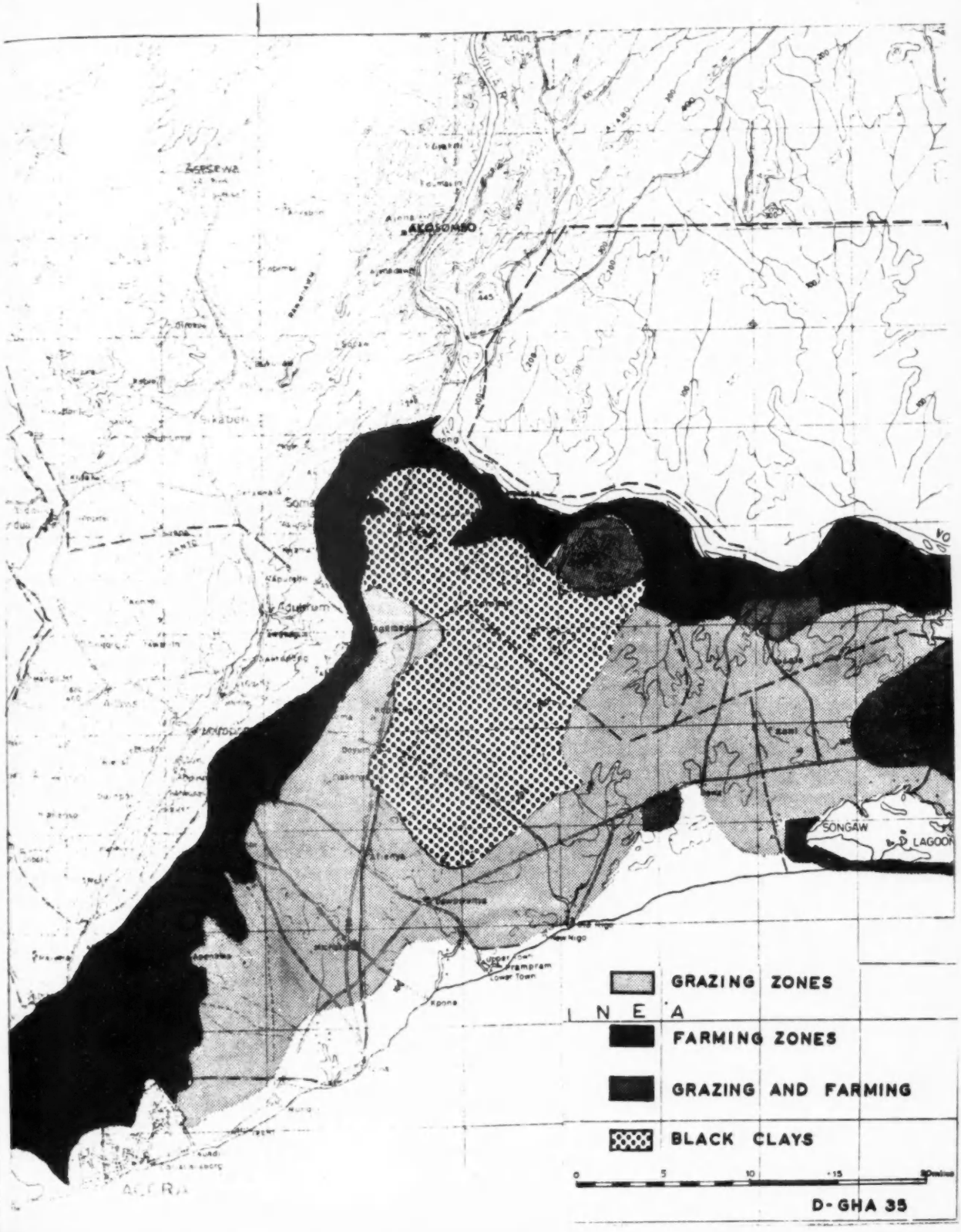
AGRICULTURAL ZONES



4. It is possible to distinguish the following ekistic areas which are marked on the map:

I. The metropolitan area with purely urban functions.

II. An area north of this which is the scene of urban and agricultural functions.

III. & IV. Purely agricultural areas.

V. An area of business - agricultural villages laid out along the road to Kpong, together with Akuse.

VI. An area extending to the dam which organically belongs to the wider region of Kwahu plateau but which is set apart in view of the anticipated development of special functions following the construction of the dam.

5. The savannah climate of Ghana portrays the characteristic distinct wet and dry seasons that occur when the wind and pressure belts move north and south. Temperatures range very little, falling between 79°F and 84°F throughout the year, with generally greater extremes experienced inland than on the coast. The diurnal temperature range, especially in the dry season when the humidity is lower, can reach 12°F to 13°F near the coast to 18°F to 30°F inland. The highest temperatures occur in February or March just before the rainy season and the lowest in January, except on the coast where they occur in August.

6. An appraisal of the country's labour force and of its distribution among the various sectors of economic activity was recently made by the United Nations expert Mr. R. R. Oswald, on the basis of the estimated population prior to the release of the results of the 1960 census, which showed Ghana's total population to be 6,691,000. The appraisals made for the year 1959 are as follows (in thousands of persons):

	Self-Employed	Wage-earners	Total	%
Agriculture, Forestry, Fisheries	1,944.5	199.1	2,143.6	69.6
Mines, Quaries	0.5	42.0	42.5	1.4
Processing	112.8	40.0	152.8	5.0
Constructions	2.6	65.0	67.6	2.2
Electricity, Water, Health, Services	-	10.0	10.0	0.3
Commerce	423.4	79.0	502.4	16.4
Transport, Communications	1.6	41.0	42.6	1.4
Services	30.7	84.0	114.7	3.7
TOTAL	2,516.1	560.0	3,076.2	100.0

EXISTING EKISTIC STRUCTURE

7. The figures given above, though of dubious accuracy, may be said to provide a satisfactory picture of the present structure of the economy of Ghana. It is significant that the highest percentage of the labour force - about 70% of the total - is presently engaged in agriculture. Conversely, industry employs a relatively small percentage (5%) of the labour force. The number of workers employed in the processing industry is extremely low, which shows that the development of industrial factories is restricted. On the other hand, the number of people engaged in trade is very high, representing 16.4% of the total labour force. It is significant that out of a total of 502.4 thousand people engaged in trade, 334.5 thousand are women, 59.3 thousand are children and only 108.6 thousand are adult men. In practice, nearly the entirety of the women are employed in trade, the greater part of retail trade being in their hands.

8. Specifically, the development of the population of Accra and the average annual rates of increase thereof since 1911 have been as follows:

Year of census	Population in thousands	Annual rate (%) of increase
1911	18.6	-
1921	38.0	7.4
1931	61.6	5.0
1948	135.9	4.8
1960	335.6	7.85

9. As emerges from these statistics, the population of Accra has increased very rapidly in the past five years. The trend towards an increased share of the urban population in the total population of the country, which may be linked to the spread of education, must be expected to continue in future to a very marked degree. Futhermore, so long as the centre of the country's industrial and business activity is destined to be in the Accra-Tema area, which is also the administrative centre of the country, it is reasonable to expect that the concentration of urban population will be greatest in these two towns.

10. According to the social and economic survey of Tema conducted in 1958, there was a resident population of 7,789 people. However, it was estimated at that time that the night population amounted to 10,000, whereas the day population was approximately 11,000 to 12,000.

11. The question is: What will be the population in the two towns of Tema and Accra in, say, twenty years time? It is estimated that this must exceed a million as against a present population of 415,000. This means an average annual rate of increase of 5% - that is to say a rate about double that of the corresponding likely increase of the total population of the country. Such a rate of increase of the urban population of Accra-Tema should not be considered excessive. Quite on the contrary, it may turn out to be conservative if the efforts made in the sector of the economic development of Ghana prove successful.

12. It appears that the settlement of the region under consideration is not more than 1,000 years old. It is believed that it came into existance as a result of migratory movements of the various peoples of the country from the Sahara to the north under pressure from other groups of peoples.

13. The history of Accra, the main urban centre, dates from the 16th century, when this locality was first settled by the Gas. There followed the settlement of foreigners, who built forts along the coast. A series of wars occurred between them and the natives, followed by the establishment of the British regime which lasted until 1957 when the country gained independence.

14. Up to 1948, Tema was a small fishing village with 1,120 inhabitants. When operations were started for the contruction of the harbour, the village was moved eastwards, beyond the Chemu lagoon, and building of the new Tema was started replacing the old village.

15. The pattern of administrative organisation in small states corresponding to racial groups is still maintained, though greatly weakened in strength. It is a vestige of an older regime of foreign occupation and racial strife. The changes in the composition of these little states resulting from continuous annexations and reshuffles have occasioned disputes over the boundaries of these states, disputes which still rage today.

THE PROBLEMS

Problems of Economic Prosperity

16. With the advance of the overall economy in the wider regions, the growth of population and the rise of its income, a sequence of major ekistic problems will be set in train affecting the population of each region. These problems are related to the organisation both of the regions themselves and of the settlements at the following main points:

a. The determination of homogeneous areas on the basis of the data concerning the general development of the economy, the geography, the topography, the climate, the demographic composition, the administration, the manners and customs, etc.

b. Determination of the role of each settlement in its immediate area and the rating of settlements.

c. Determination of the main ekistic complex of each wide region, i.e. of centres grade A (small villages) B (larger villages), C (villages composed of free holdings), etc. together with their respective areas, as well as integration of these centres depending on the order and degree of reciprocal service.

d. Determination of the main transport network in each area in accordance with the above.

17. The economy of Ghana is largely dependent on the production of cocoa. This commodity is the most important source of money income of the agricultural population of the country and it exercises a strong influence on the other sectors of the economy. It accounts for about two thirds of the total value of the country's exports. In short, thanks to cocoa, the export of which makes it possible to finance a high level of imports, the Government can exercise control over a large proportion of the national resources of the country. This makes it possible to finance a level of investments a great deal higher than that of many other countries which find themselves in about the same stage of development as Ghana.

18. It is probable that it would not be realistic to seek to achieve the agricultural development of the Accra-Tema area, at least in the immediate future, on the following principal grounds:

a. The whole of the area north of the towns of Accra and Tema to the approaches of the hilly heights is very sparsely populated.

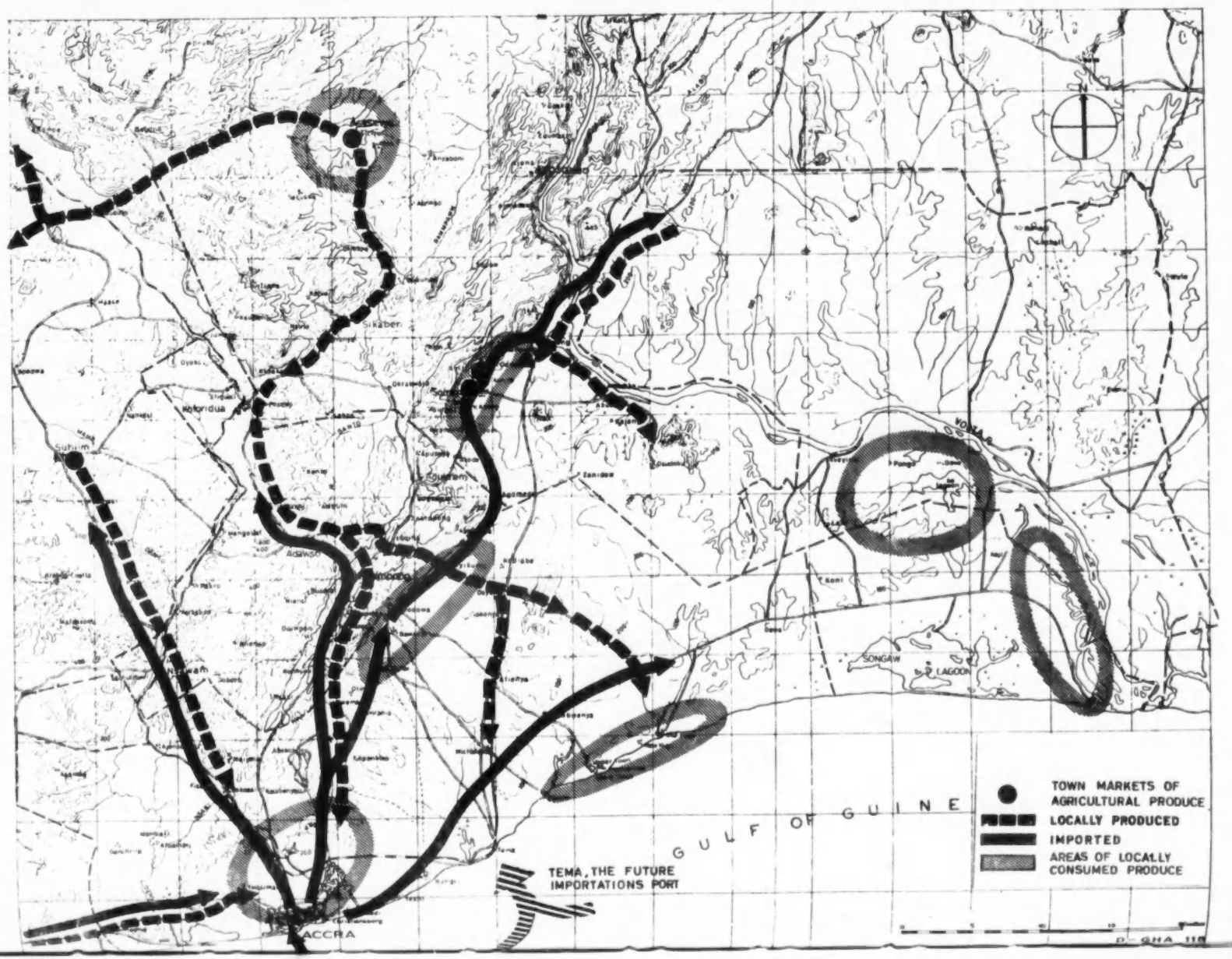
b. This small population is not composed of farmers, in the strict sense of the word. They engage in farming and live-stock breeding to a very small extent.

c. The various typical classes of soil encountered in the area, whether these are red or grey earths or black clays, are short of the main nitrogenous or phosphate constituents, so much so that their improvement would entail heavy fertilising expenditures for the purposes of cultivation.

19. Finally, it must be pointed out that the agricultural development of the Accra plain is not necessarily the most economical solution of the problem of feeding the Accra-Tema urban population, at least during the next 10 to 20 years. Already large quantities of food supplies come from other areas of the country (such as the Asosewa market in the north, not very far from Accra). On the face of it, it appears that the task of increasing agricultural production in those areas which currently supply food to the capital and the other urban centres of the country would be easier and would involve a relatively smaller expenditure of capital. These areas could supply, at least for the most part, the additional quantities of food supplies and general agricultural products needed to feed the urban populations during the next 10 to 20 years.

20. The construction of the hydroelectric power station of the Volta river, at Akosombo, is a basic feature of the country's development programme. This survey, in making its proposals, has taken for granted the building of the dam and of the power distribution network dependent upon it. The Volta project will exercise an enormous influence on the ekistic structure of the region, both in respect to the population which will gather there during the process of its construction, and also to the compulsory removal of the popula-

MOVEMENT OF GOODS



tion which is today settled in the 3,275 sq. mile region that will be flooded by the artificial lake. Subsequently, the grouping of a certain number of activities, such as industry, irrigation, mining, etc., will alter the present situation in the region and will raise vast ekistic problems which should begin to be studied at this stage.

21. Accra is the starting point from which imported commodities move on to the hinterland, whilst the local products, mainly agricultural commodities, are collected primarily in Asesewa and Suhum, being channelled afterwards to the centres of consumption. A second flow of local goods starts from HO whilst a third from that of Winneba to Accra. A change should be expected in this pattern of movements as soon as the Tema port comes into operation, which will be primarily an import port.

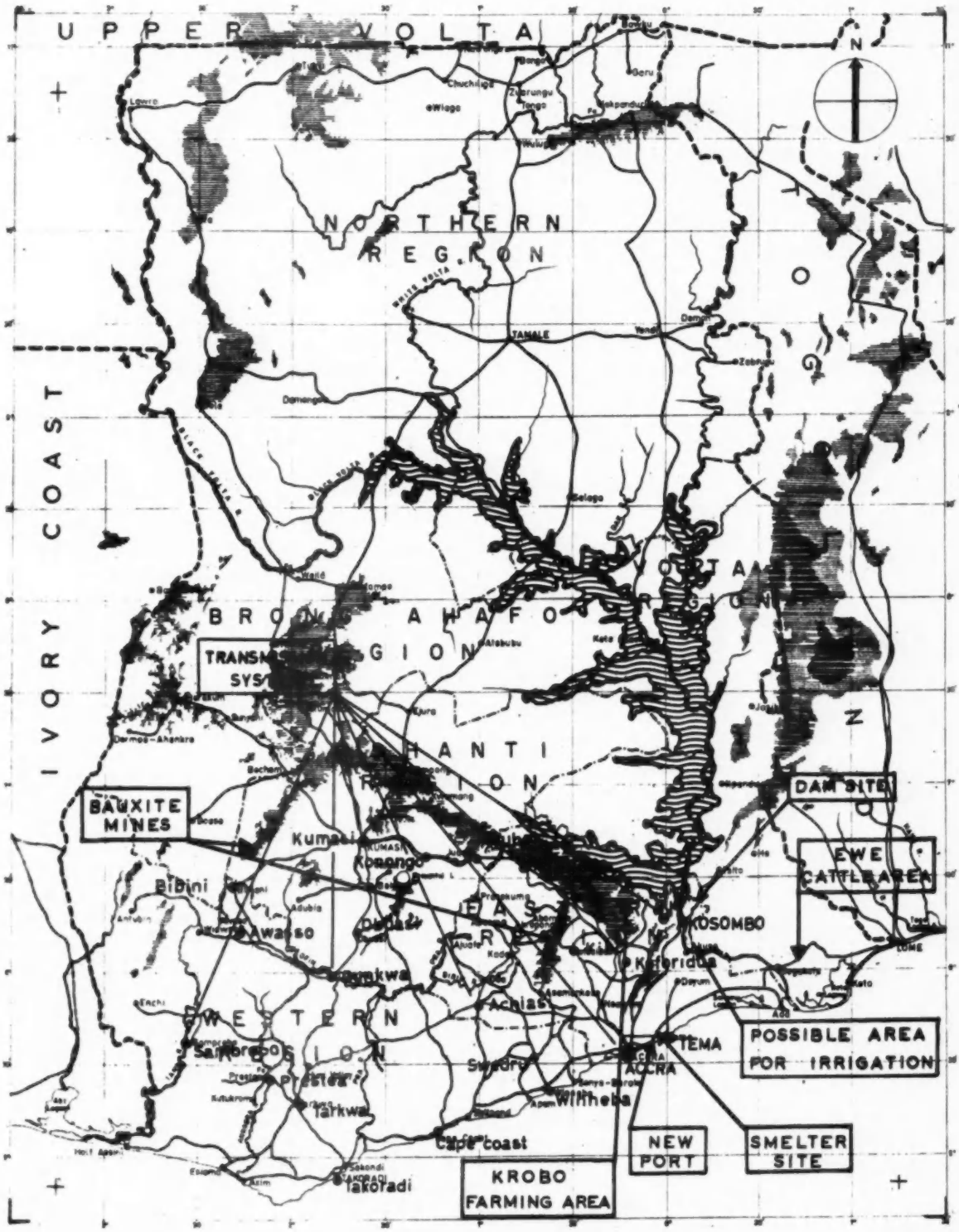
22. The insufficiency of skilled labour is actually today a serious obstacle to the economic operation of the existing industrial productive units. The main source of industrial workers is agricultural labour, which cannot be efficiently used in industry without vocational training and the acquisition of the necessary experience and specialisation. Likewise, the noted large labour turnover, which will be unavoidable until such time as workpeople settle permanently and adapt themselves to the conditions of industrial employment, interferes with specialisation and has an unfavourable effect on labour efficiency. In these circumstances, and despite the fact that wages in Ghana are much lower than those in force in more developed countries, the cost of labour per unit of production is in many cases higher than that in industrialised countries, precisely because the differences in labour efficiency are greater than those in wages.

23. Total fixed capital investments have developed as follows in recent years (in million pounds):

	Private	State	Total
1954	19.2	19.7	38.9
1955	21.3	21.2	42.5
1956	25.9	19.4	45.3
1957	25.4	17.9	43.3
1958	24.5	16.2	40.7

24. The above fixed capital investments account for about 12.5% of the gross national income at market prices. This percentage must be considered rather high, if compared to the corresponding levels of investment in other countries which find themselves at about the same stage of development as Ghana. It is significant that Ghana has in recent years achieved this level of investments without any financial assistance from abroad. The sole source of finance for these investments has been domestic saving, both private and public. Ghana in fact, finds itself in an advantageous position compared with many other economically backward countries, in the sense that the structure of its economy enables the State to exercise control over a relatively large section of the national resources and to apply them to economic development projects. The high foreign trade level makes it possible to obtain large public revenues through the imposition of duties both on imports and exports. Moreover, the policy followed by public organisations which market the country's exportable commodities enlarges even further the existing margins for the financing of investments at home.

THE VOLTA RIVER PROJECT AND RELATED ACTIVITIES



24. According to the official statistics, Ghana has the highest per capita income of all African countries (with the exception, of course, of the Union of South Africa), as well as most of the Asian countries. On the basis of an estimated population of 4,836,000 for the year 1958, prior to the last census, the estimated per capita income for that year amounted to 70-16-0 pounds (or $198.00). The recently released returns of the census put the total population of the country at 6,690,000 as of the beginning of 1960, and the forthcoming revision of the appraisals of the national income will probably show the per capita income for the year 1959 to be higher than 60 pounds, and possibly even close to 70 pounds when account is taken of the fact that that year was one of extremely satisfactory harvests.

Problems of Communications

26. The transport problem in the region is affected by following three main factors:

a. The foundation of Tema.

b. The general economic development which lends ever increasing significance to the large urban centres and particulary to Accra, the Capital.

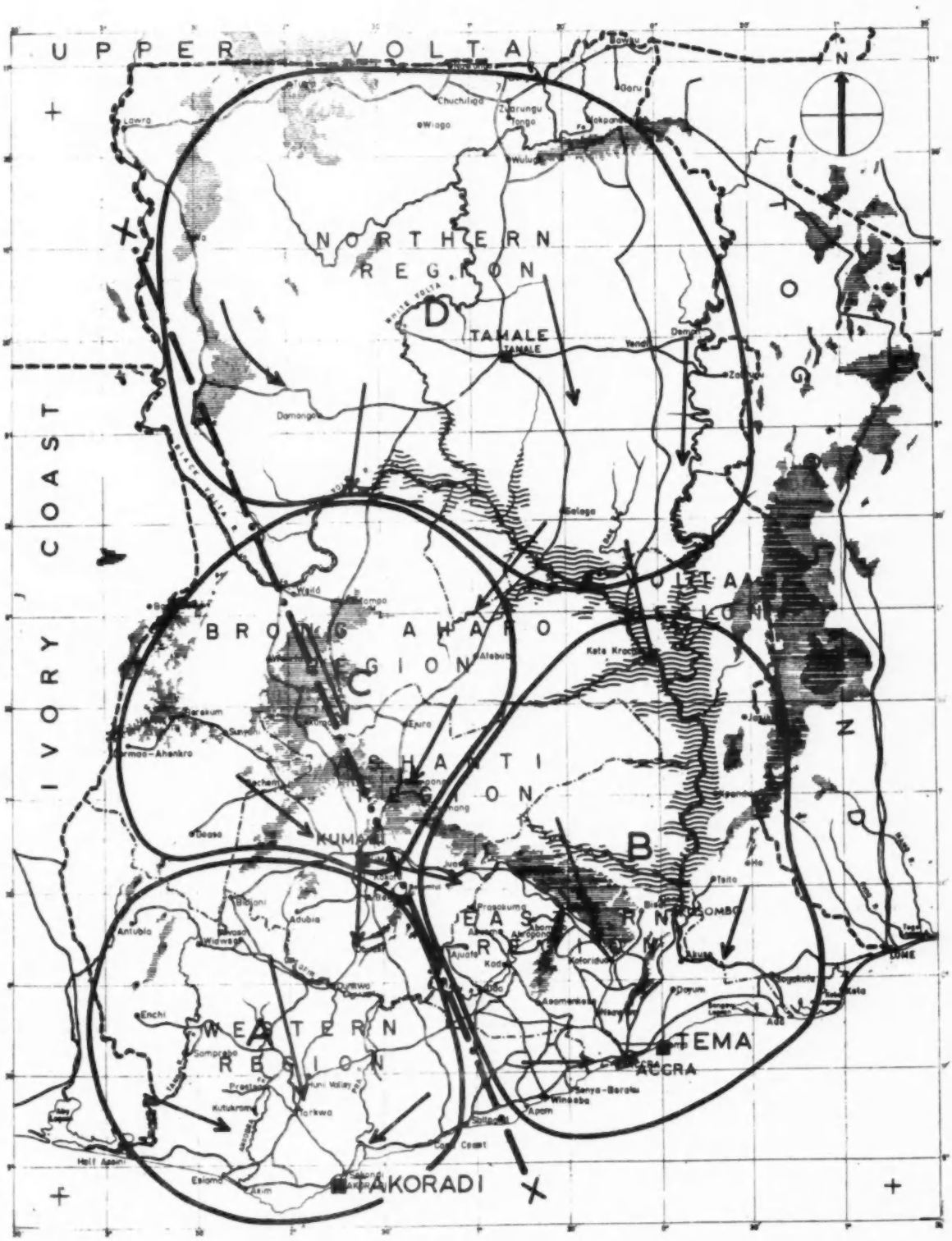
c. The prospective agricultural development of the Accra plain.

27. Factors (b) and (c) will not bring about sharp changes in the present state of equilibrium. Nevertheless, the foundation of Tema is a factor which will influence the present state of affairs in the communications sector. This is why special solutions and special planning should be proposed. Geography is in favour of the new town. An effort is made to prove this on the map on the front cover. The X - X line is the geometrical locus of equal distances from the ports of Tema and Takoradi as the crow flies. This line is merely of theoretical importance, but it does provide a general picture of the country, the greater part of which lies nearer to Tema than to the only existing port of Takoradi.

28. It is to be noted that at Accra, shipping lies at anchor out in the open sea, and there is no possiblity of unloading heavy and bulky loads (motorcars, machinery, etc.). Hence, when the Tema harbour is open to shipping (in which case the entire volume of goods now unloaded at Accra will be carried there), we should expect a considerable increase in the percentage of imported goods at the expense of Takoradi which will henceforth confine itself to serving mainly region A and part of region C on cover. So from 1962 onwards, by which time the Tema port will have come into full operation, it would be reasonable to anticipate that 70% to 80% of the volume of imports would be directed to Tema and only 20% to 30% to Takoradi. Only the lack of private storage space in Tema could somewhat delay this development, say until four years from now instead of two.

29. The distance (measured in time and cost) of a trip between any two places is affected by physical geography which to some extent also conditions the

TEMA AND TAKORADI AND HINTERLANDS



transport network. This is why on the basis of the X - X theoretical line we divided the country into four regions, each of which is discussed below.

Region A. The distance from all the points in this region are shorter to Takoradi. Transport to and from this port will be more economical compared with Tema. This region will be served by Takoradi both in respect to imports and exports.

Region B. For exactly the same reasons region B will be served exclusively by Tema.

30. Region C. This region lies on either side of the X - X line. But all movement is concentrated at Kumasi whence it is channelled to the south and vice versa. The question of what is to become of Kumasi should therefore be investigated. Kumasi is situated very close to line X - X and in road distance it is at the moment somewhat nearer to Tema. If the new road we are proposing is built, it will find itself even closer to Tema, unless a direct Takoradi-Kumasi road is also constructed in which case the distances will be approximately equal. So, generally speaking, Kumasi will be served by both harbours, the choice between the two being dependent each time on the type of goods and on the capabilities of each harbour at the time.

31. Region D. This northern region of the country is served by road mainly from Kumasi. We have however shown it because, when the artificial Volta lake is built, the situation may change radically, and transport by floating across the lake will again be to the advantage of Tema.

Problems of Public Health

32. The problems of health in Ghana are many and varied. They range all the way to superstition and the use of herbalists, of whom there are hundreds in the country. They include an extremely high mortality rate for children (40% for children under 8). They are seen in the lack of medical facilities and medical personnel: there are currently only 59 hospitals providing 5,000 beds in all of Ghana. There are only 212 doctors, 14 dentists, 1,770 nurses, 690 midwives, and 325 pharmacists.

33. The importance of a programme for improvements in public health in the Accra-Tema area cannot be over-stressed. With the expected increase in population this area will contain people crowded into inadequate housing under disease promoting conditions, which will reduce the effectiveness of the country's centre, if not checked. Unless the Government begins immediately, the rapid population growth will so intensify all the problems that their solution will be postponed for years.

34. An adequate drainage system in connection with a comprehensive sewerage system must be planned. Present open drainage ditches, septic tanks, and basket latrines constitute serious hazards to the health of all living in the Metropolican area. The danger of water main invasion by sewerage from the over-saturated soil is a constant threat. Refuse, now dumped or thrown in drainage ditches, should be collected and disposed of in an organized way. Any campaign against disease, in particular malaria, would be

useless without removal of the thousands of breeding opportunities. Food protection, carried out through construction of proper slaughter facilities and provision of sanitary market conditions, represents another area for Government Planning.

35. Government expenditure and construction, however, even if carried out along the preceding lines, would still leave a large gap in the health programme. This is a gap that can only be filled by the education of the people: education in the need for and the correct use of sanitary facilities and sanitary methods of living.

36. Education must further extend to the proper selection and use of clean and nutritious foods. Improper diet, while more subtle than disease, can drastically reduce the effectiveness of the population. This is particularly unfortunate in Ghana where a basic supply of high protein food in the cattle and fishing industries, could easily provide a vastly more adequate diet for much of the population. This would require the breaking down of some of the traditional food patterns and, the cooperation of the food trade monopoly enjoyed by the "mammy" traders, and a change in the social significance of cattle to the native population. Its accomplishment, however, would be of such importance to the health of the people that it would warrant intensive Government effort.

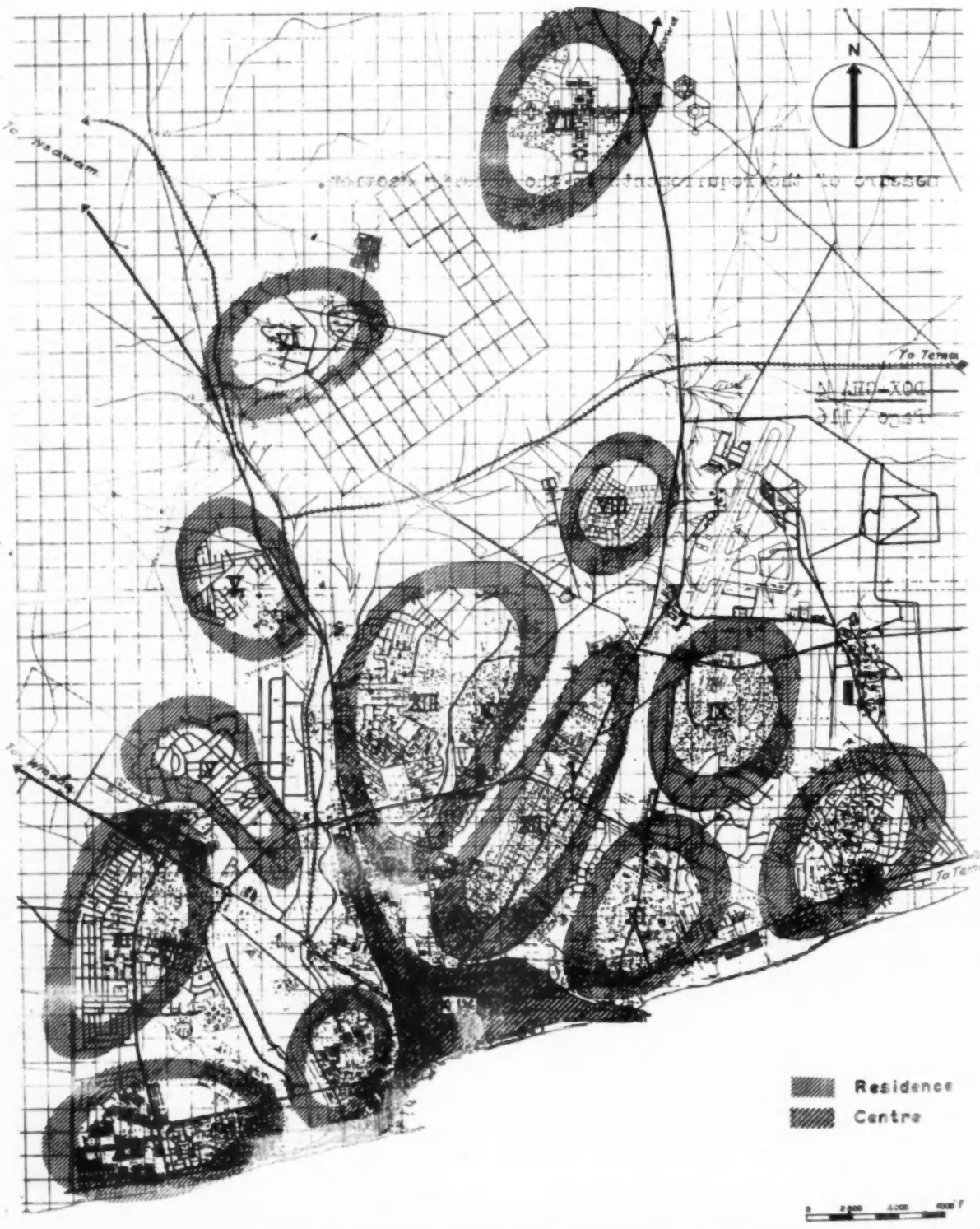
Problems of Housing

37. As a result of the manner of settlement of Accra, the town has not yet acquired an integrated aspect. In point of fact it consists of a group of settlements which leave housing gaps in-between and which are linked up by a tolerable road network. We therefore established the present grouping of communities in relation to the community at the Centre. The type of house is different in the communities of different income brackets.

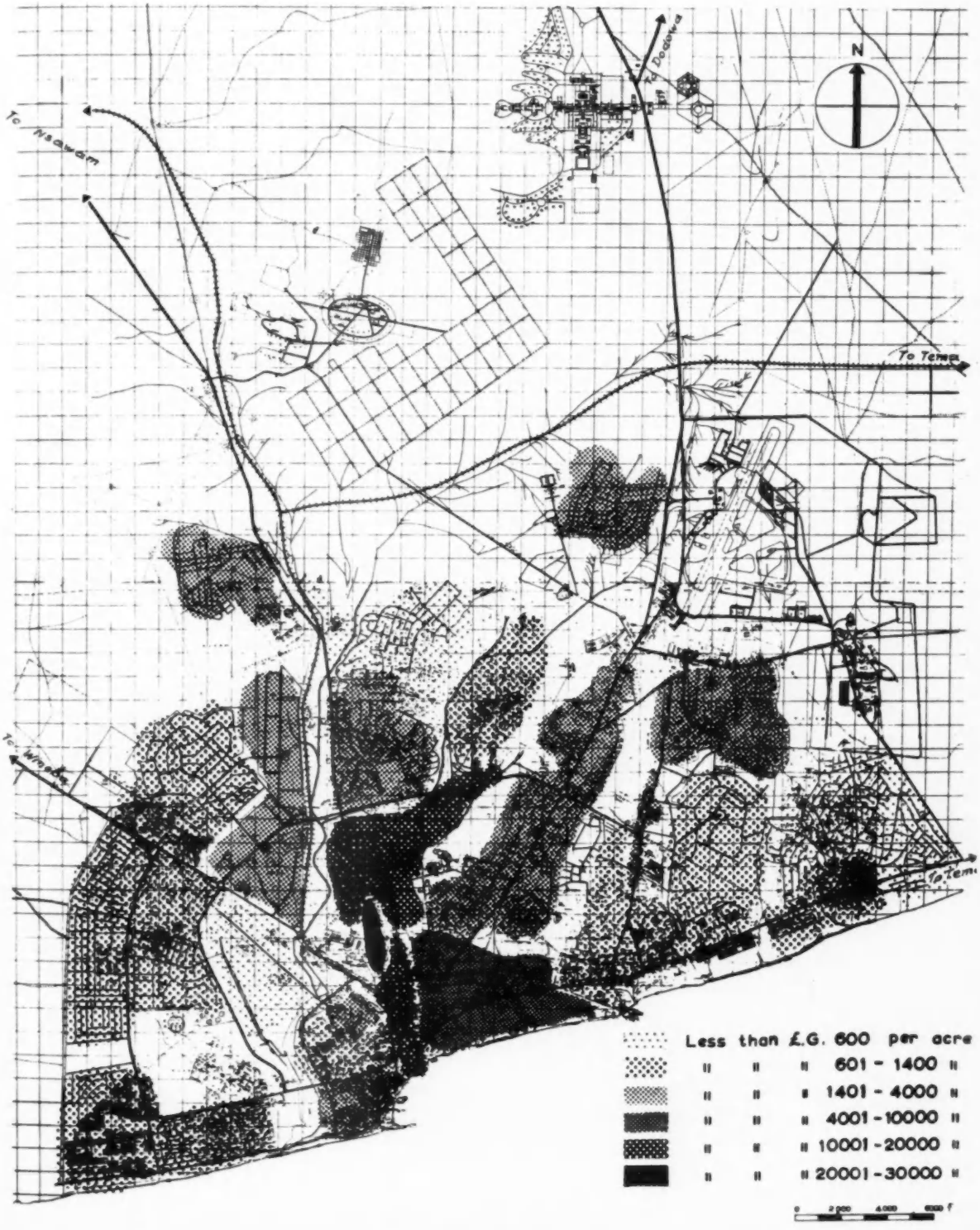
38. There is no doubt that the worst conditions prevail in various small districts of the central area where, in addition to the poor housing conditions, density is very high, ranging between 400-1, 200 persons per hectare. In these districts - which are characterised as slums and which have to be totally cleared - there live, according to the census, 29,000 people requiring thus, 4,900 new houses, considering that one house is needed for an average family of six members.

39. Another category groups houses in third rate districts where amelioration is necessary. These districts are less densely populated than the slum districts - some of them even show a normal density - but they have no roads, facilities, community buildings, open and green spaces, etc. In these districts there live about 67,000 people. To improve their living conditions a number of houses have to be cleared to lower the existing density and to provide the space required for the construction of roads, buildings, squares, etc., while the remaining houses have to be furnished with the necessary facilities and public amenities.

EXISTING COMMUNITY GROUPS



L A N D V A L U E S


N
To Nagpur
To Dadra
To Tema
To Tema
Less than £.G. 600 per acre
" " " 601 - 1400 "
" " " 1401 - 4000 "
" " " 4001 - 10000 "
" " " 10001 - 20000 "
" " " 20001 - 30000 "

It is estimated that 25% of the residents will need new houses as a result of the thinning of the population which will have to be effected, which means that 3,100 new houses will be required.

40. In all a total of 8,000 new houses are required on account of clearance, while living conditions must be improved in another 8,000 houses.

THE POLICIES

Future Functions

41. The regional network of settlements should be planned to define the hierarchy of functions and the role of each settlement, after taking into consideration present and planned general economic development of the region, present and desired population distribution, as well as various economic, social, geographical, technical and administrative factors. The major centres should be located on the basis of optimum distances between them, readily accessible to each other with modern means of communications. Thus, the future role of some existing towns whose central functions will soon be taken over by new one to be created in the same region, should be seriously questioned before deciding any major programmes for these towns.

42. Specific regional plans and programmes should be prepared to determine the location of the areas of work, residence, recreation as well as communications. Special attention should be given when locating housing schemes related to new industries, so as to prevent the creation of new communities which would be independent or isolated from existing towns. These housing schemes should, in principle, be part of existing settlements, thus contributing to the solution of the problems of the overall area.

43. The present-day ekistic structure of the Accra-Tema-Akosombo region reflects its general degree of development. In principle, the limits of the ekistic area as such extended only to the locality of Kpong, until the decision to build the Akosombo dam. There were thus three distinct ekistic units:

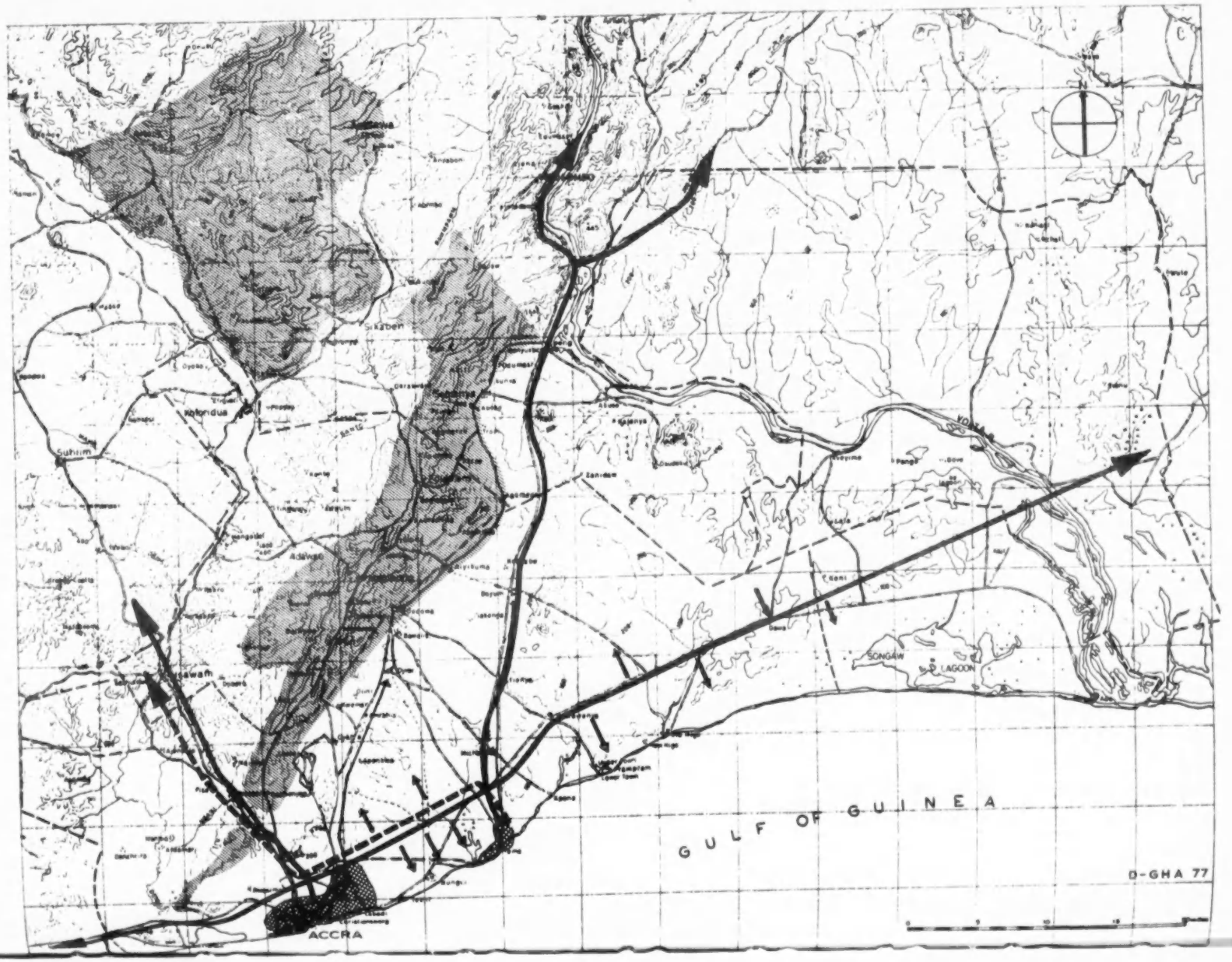
a. The southern group with the capital as the centre.

b. The central group with its centre Dodowa, which was formerly an important centre in the wider area of the Accra plans and had Prampram as a port.

c. The northern group with more than one centre, namely Somaniya, Odumasi, Kpong and Akuse.

44. It is significant that:

a. All these centres lie on the main road leading from Accra to the north passing through the approaches of the hills to the west.


Sikaben
Kpandu
Volta
Tema
SONGAW
LAGOON
GULF OF GUINEA
ACCRA
D-GHA 77

b. The importance of the various settlements declines as one moves east, on account of the lack of any economic activity. This is due to the unsuitability of the ground, to the lack of water, roads, etc.

45. Development plans relating to the immediate future of the national economy in the Accra-Tema-Akosombo area, include two elements:

a. The construction of the Akosombo dam.

b. The construction of the large port of Tema.

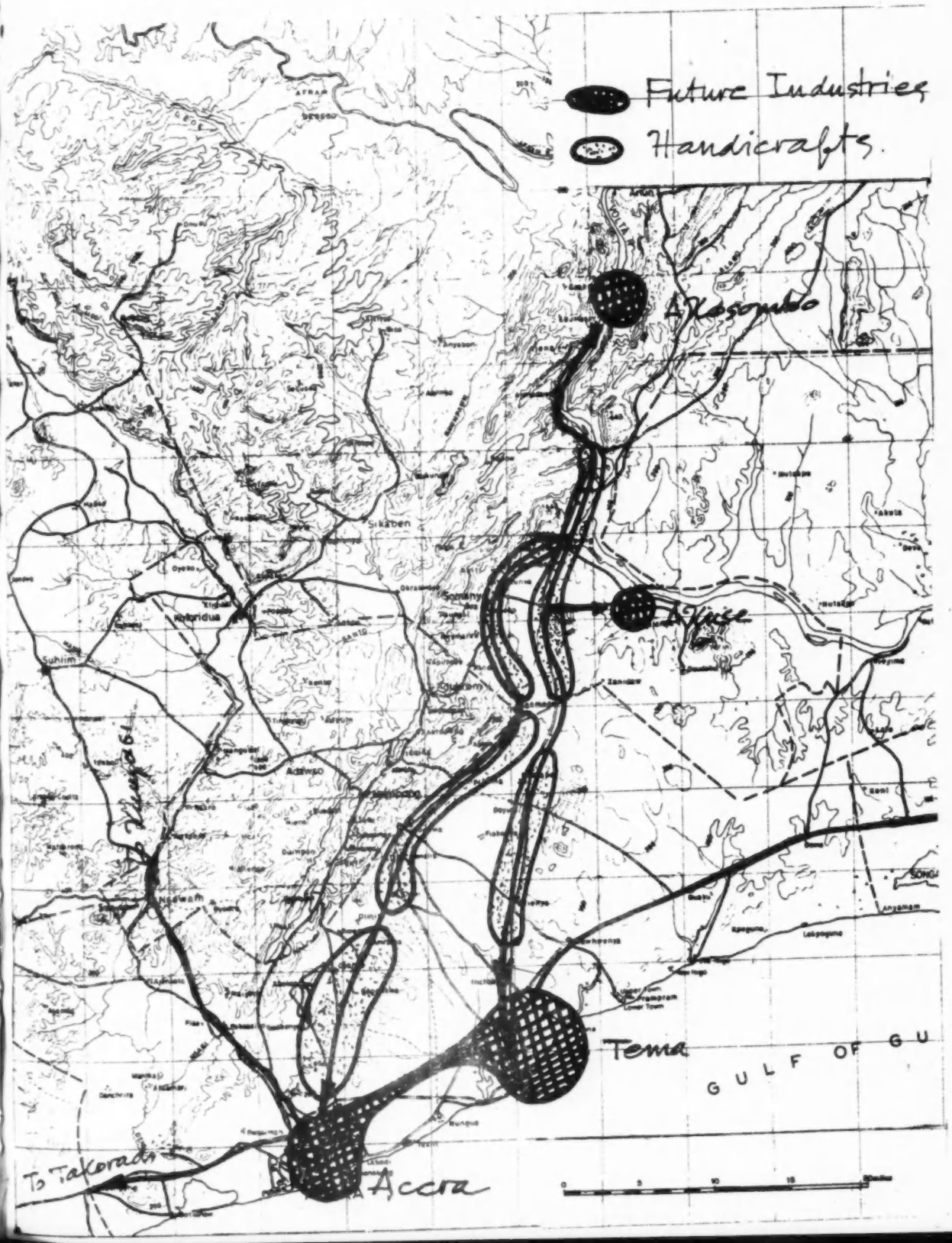
46. Three specific questions arise: First, what is the degree of industrial development, whatever the method used in measuring it, which could be achieved in the next 10 to 20 years. Second, what types of industries are likely to be developed and to what degree? Third, what will be the geographical distribution of the industrial centres to be built up and what will be the importance of each?

47. It would be wrong to consider the difficulties encountered today in promoting industrial development as permanent or insurmountable. It has been argued that these difficulties will be reduced to the extent to which progress is made in the industrialisation of the country. It is therefore reasonable to expect an accelerated rate of increase in industrial production and employment. These considerations justify the conclusion that, though it is unquestionable that Ghana will remain basically an agricultural country, the contribution of industrial processing to the national income will increase steadily. Nevertheless, the data at present available are not sufficient to enable one to determine with even relative accuracy the contribution of this branch to the national income in 10 or 20 years.

48. It should be emphasised that the size of the Ghana market is an obstacle to the development of certain industries which require very large productive units in order to achieve a low cost per unit of production. There are in fact a good many cases where the country's entire production would not be sufficient to support the operation throughout the year of even a single factory of the right size to achieve a low cost of production. Industries of this sort can not successfully operate in Ghana. Furthermore, the management of very large enterprises presents problems and presupposes the existence of organisational enterprising skills of which there is a shortage in Ghana at the present stage. In cases, however, when it is judged possible and advisable to establish industries in the category under consideration, it is essential, with a view to achieving a low cost of production per unit of production, to concentrate production at a single point from which it can supply the entire country. As will be explained below, this strengthens the ability of the Capital area, with the new Tema harbour, to attract industries of this category.

49. The mere fact of the operation of the Tema harbour alone will cause the centre of industrial activity in Ghana to be placed in the Accra-Tema area. The execution of the Volta project will be a further decisive factor in the movement of the centre of industrial activity to the Accra-Tema area.

INDUSTRY AND HANDICRAFTS



The production of aluminium will materialise in this area. Generally speaking, the Volta project will supply the area with cheap and abundant electrical energy and will attract industries which consume large amounts of electrical power. Likewise the construction of a more than 200 mile long artificial lake will greatly facilitate communication between the Accra-Tema area and the eastern and northern districts of the country and will in this way enhance the importance of the area as the main industrial centre of the country.

50. It may be argued that the Accra-Tema area (and possibly the Accra-Tema-Volta project triangle) will attract the bulk of the country's economic activity. Precisely to what extent it is not of course possible to determine. On condition that the above anticipated increase in industrial production and employment actually materialises, it is reasonable to estimate that at least two thirds of it will be concentrated in the Accra-Tema area. This means that the increase in industrial employment in this area will amount to 15,000 in five years; to 40,000 in ten years; and perhaps to 140,000 in twenty years. Correspondingly, the increase in industrial income will amount to between 3 and 4 million pounds sterling in five years' time, to between 10 and 12 million in ten years' time and may reach 50 million pounds in twenty years' time. Even today, indications are that Accra contains more than half of the country's industrial employment, producing the majority of goods in all industries except timber.

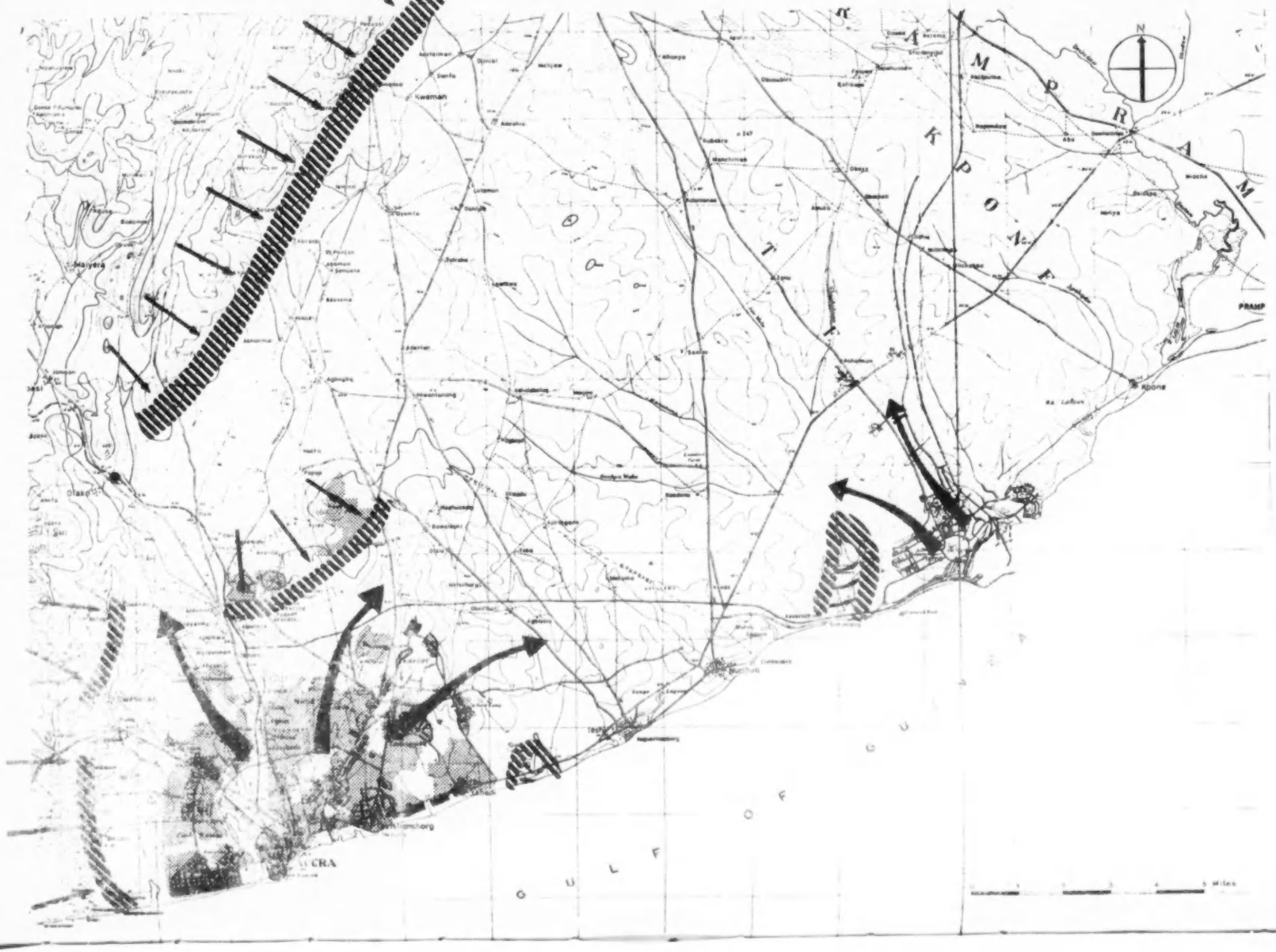
51. Tema offers important advantages and should be expected to attract heavy industries, such as metal processing and chemical industries while it is reasonable to think that Accra will tend to attract light industries. As for the share of the industrial development it may for the moment be assumed half will occur in Accra and half in Tema. It can be expected that industry in Tema will involve more capital and that production per employed person will be higher in comparison to the lighter industries at Accra. It follows that industrial income may increase more rapidly in Tema than in Accra. If so it is probable that Tema may develop into the main industrial centre of Ghana.

Physical Development

52. Development of Accra is obstructed on the west by a large lagoon, on the north by the complex of University buildings, further north by the Akwapim Range, on the east along the shore line by the Kreshi lagoon, and on the south by the sea. Accra is developing under the influence of internal forces which are pressing through the gaps left between the obstacles referred to above. Tema can develop along the main road to the Volta, but on the west its development is obstructed by the Sakuno lagoon.

53. Three highways contribute to the formation of the metropolitan framework:

TRENDS OF AND OBSTACLES TO DEVELOPMENT



a. The highway from Accra to Kumasi

b. The highway from Tema to the Volta and

c. The Accra to Tema section of the East west highway.

54. This leads us to a proposal where we show schematically the location and manner of operation of the system of the three highways.

55. We note the trends of development of the main masses of the two towns Accra and Tema which, on the one hand, attract each other mutually, while, on the other hand run perpendicular to the coast towards Kumasi and Volta. The main axis parallel to the coast becomes an element of dependence for special functions.

56. If the town were to develop over a theoretical plane, and without any physical bounds relating to the ground, it would be necessary to bear in mind the hexagonal pattern which governs the location of settlements in such surroundings and hence to have axes leading to the surrounding area.

57. In viewing the region in this way in its general relationship to the surrounding space(and withdrawing the two directions which are virtually taken over by sea transportation) we reach the conclusion that we have 4 roads two of which run along the coast, one west and the other east, whilst the remaining two stretch to the interior of the country.

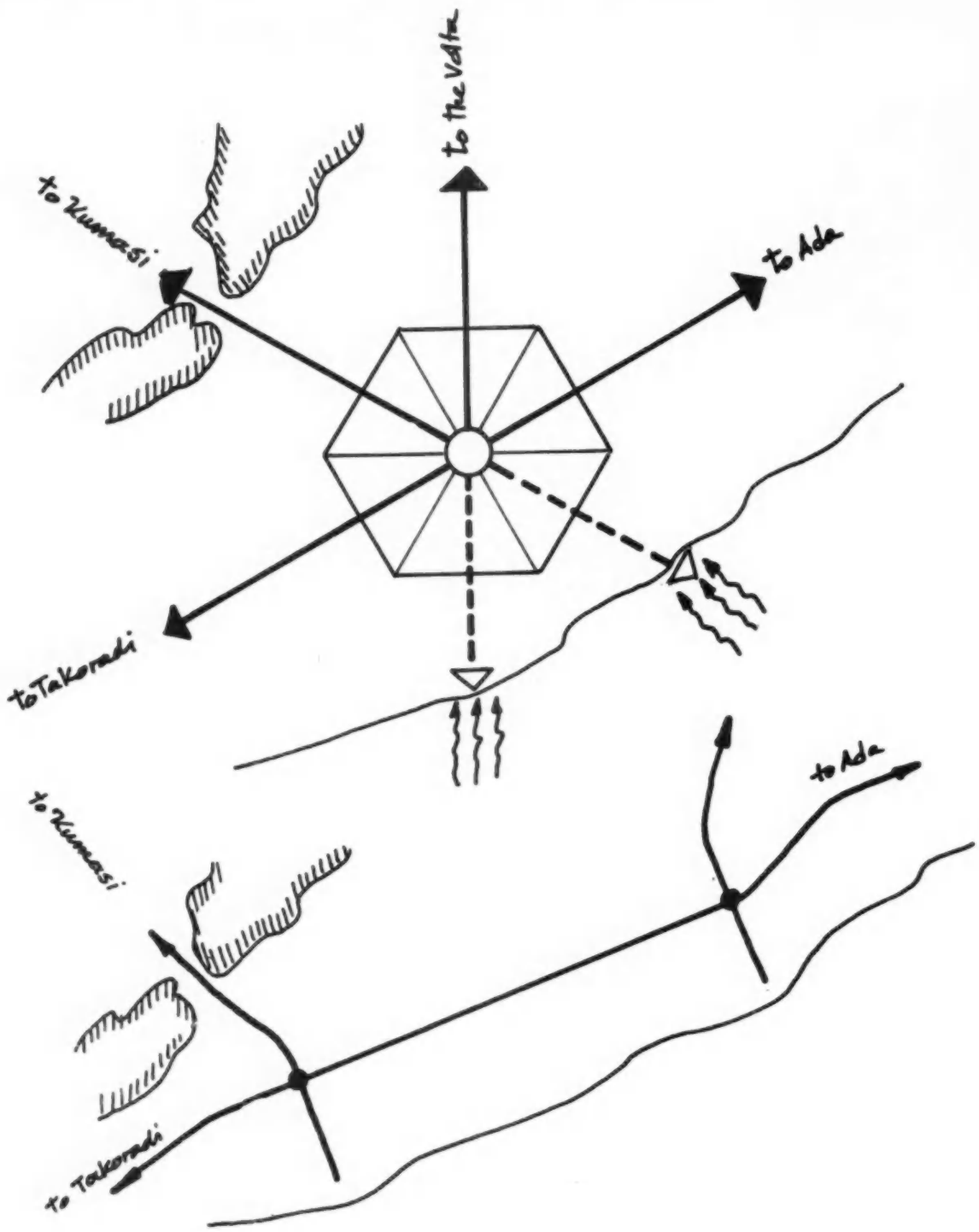
58. The question now is how these roads are to be linked together in a system of axes. From the theoretical point of view it can be seen that the rectangular system is best suited to the organization of the town because, in contrast to the hexagonal system, which determines the unexploited space of the countryside, it determines the best possible way of securing the most rational structure of a built up area.

59. This way leads us towards a system of axes, some of which run parallel to the coast, whilst the others are vertical to it. This system of coordinates dictates a grid system which forms the main network of the metropolitan area. The category of these roads is determined by the requirements of a rational organisation of the region into communities of different classes. This grid determines the free motor-car circulation network, the result being that roads will intersect at distances of 3 kilometers, or somewhat less than 2 miles.

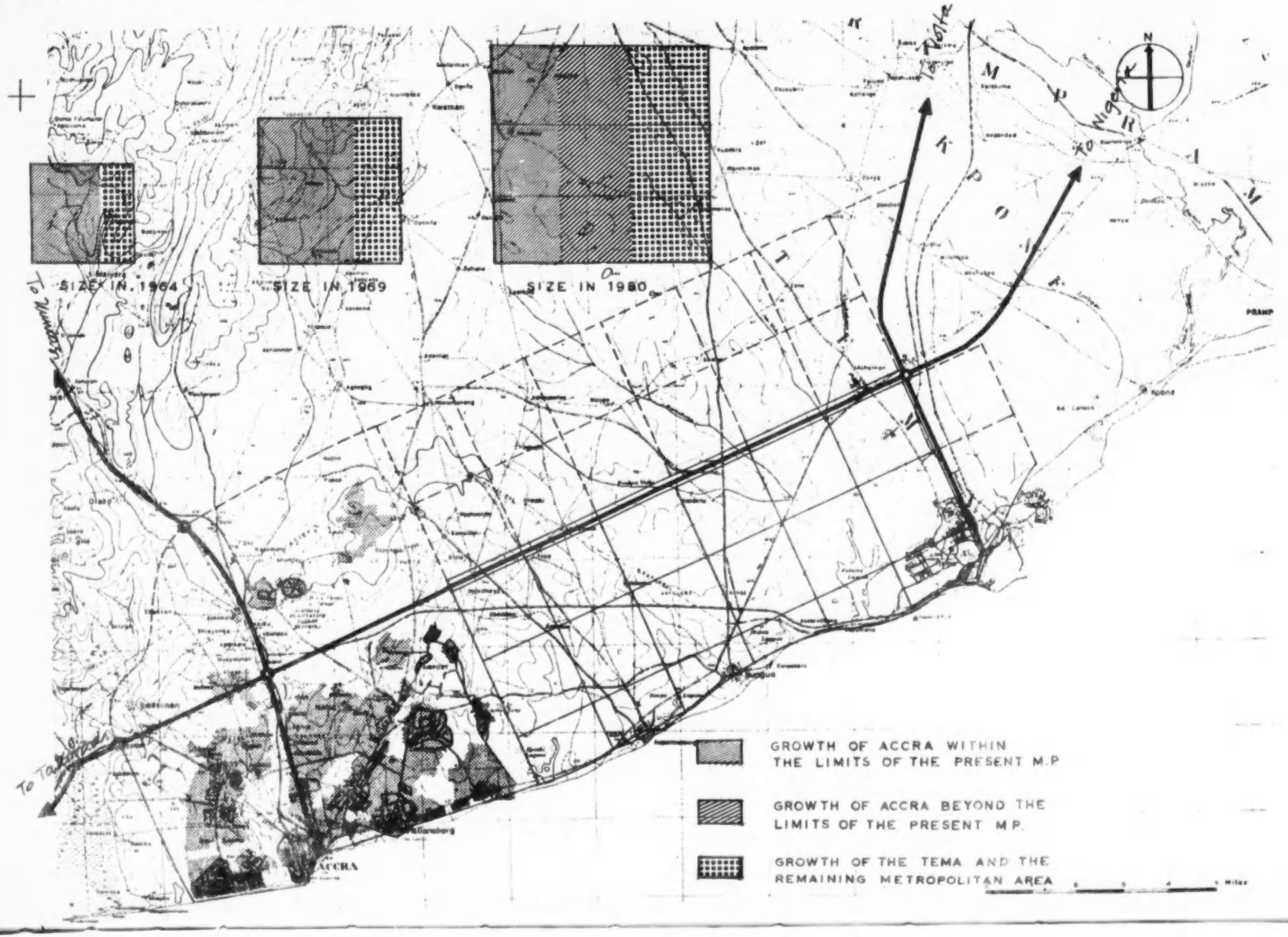
60. The resulting squares will define grade V communities, which are the motor-car communities, within which we shall find lower scale human communities. We thus fix a very specific hierarchy of circulations.

PROPOSED RAIL AND HIGHWAY SYSTEMS

PHYSICAL FEATURES AND HIGHWAYS



ANTICIPATED GROWTH IN AREA OF THE METROPOLITAN REGION OVER THE NEXT 20 YEARS.


SIZE IN 1964
SIZE IN 1969
SIZE IN 1980
To Winneba
To Keta
To Nsawam
To Tafo
ACCRA
GROWTH OF ACCRA WITHIN THE LIMITS OF THE PRESENT M.P
GROWTH OF ACCRA BEYOND THE LIMITS OF THE PRESENT M.P.
GROWTH OF THE TEMA AND THE REMAINING METROPOLITAN AREA

61. The analysis made of the history of the towns and the history of the region shows that the main trends both of Accra and Tema are towards the interior, perpendicularly to the coast. This is evidenced mainly by the natural trend of trade to develop along the road to Kumasi, along which other main functions also are located, and by the development of Tema in depth. A parallel trend, which will daily become more and more manifest, will be that of the functions of Accra and Tema coming closer together. This is a normal tendency in the case of two towns lying close to each other, particularly when they are mutually complementary, as the administrative and central functions of Accra will complement the industrial and port functions of Tema.

62. We should therefore anticipate that two prospective Dynapoles will come into being, one inside Accra along a national axis and the other inside Tema along the other national axis. The distances between these two centres are however such that they cannot serve the whole of the area in between. Thus, when this area one day becomes developed and built up, it will be necessary to create a third centre running parallel to the others. This centre will of course develop on its own, spasmodically and sporadically, without any uniformity, if we let things drift. If we, however, plan in advance, it may then be created in a rational way such as would make it easy to give equal service to the area between the two towns.

63. It is to be expected that the successive development will take place in the following order:

a. The first development will take place in Accra within the rectangle ABCD. At the same time Tema will develop north and west of the present town.

b. The next development will be along the main Accra-Tema main axis, until completion of the zone comprised between the present towns.

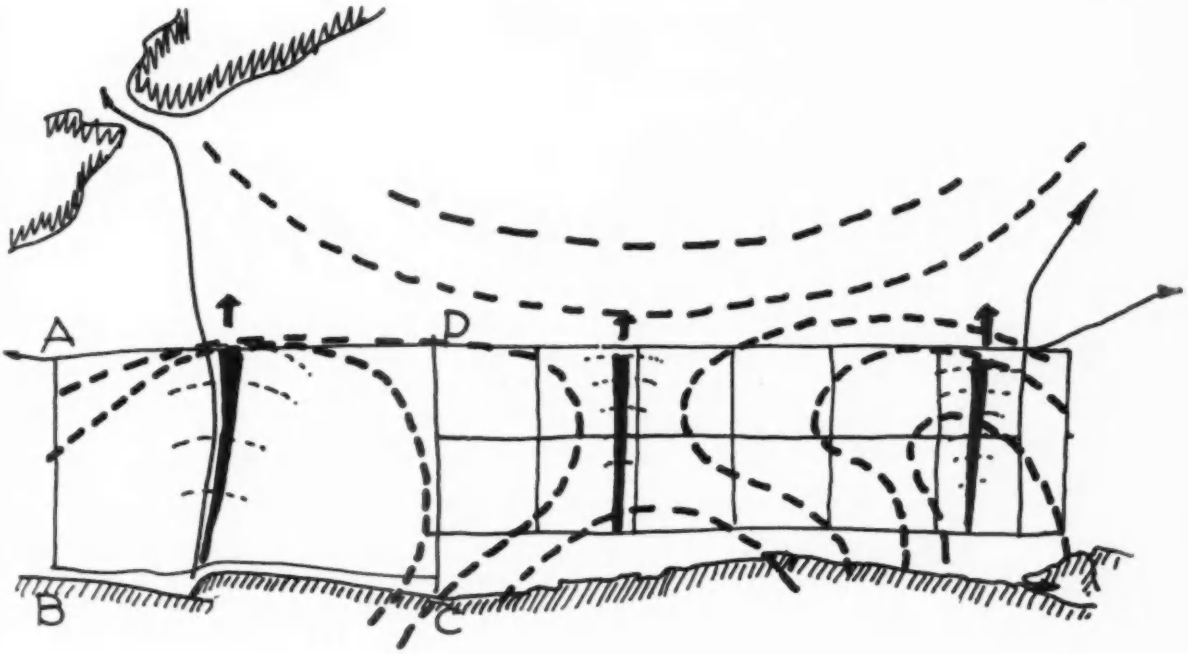
c. Much later the section north of the axis will be developed.

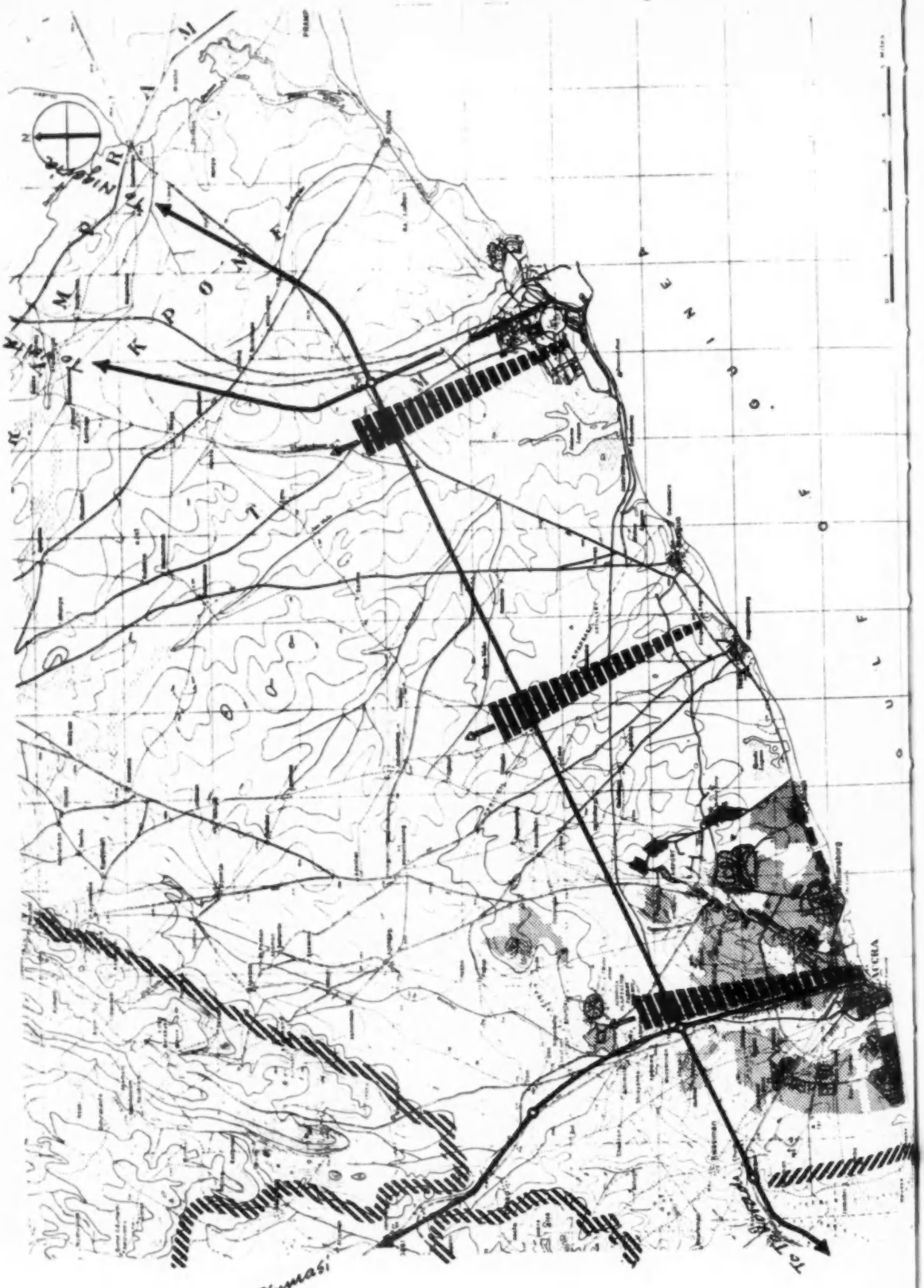
Financial Considerations

64. It is felt that it would be inadmissible for private persons to derive immense financial profit from the urban development of large areas in the metropolitan zone of Accra-Tema. It is the Government, which will be planning and programming the development of these areas, which should reap the profit from the rise in land values, for the benefit of the community as a whole.

65. The adoption of this principle would lead to the following:

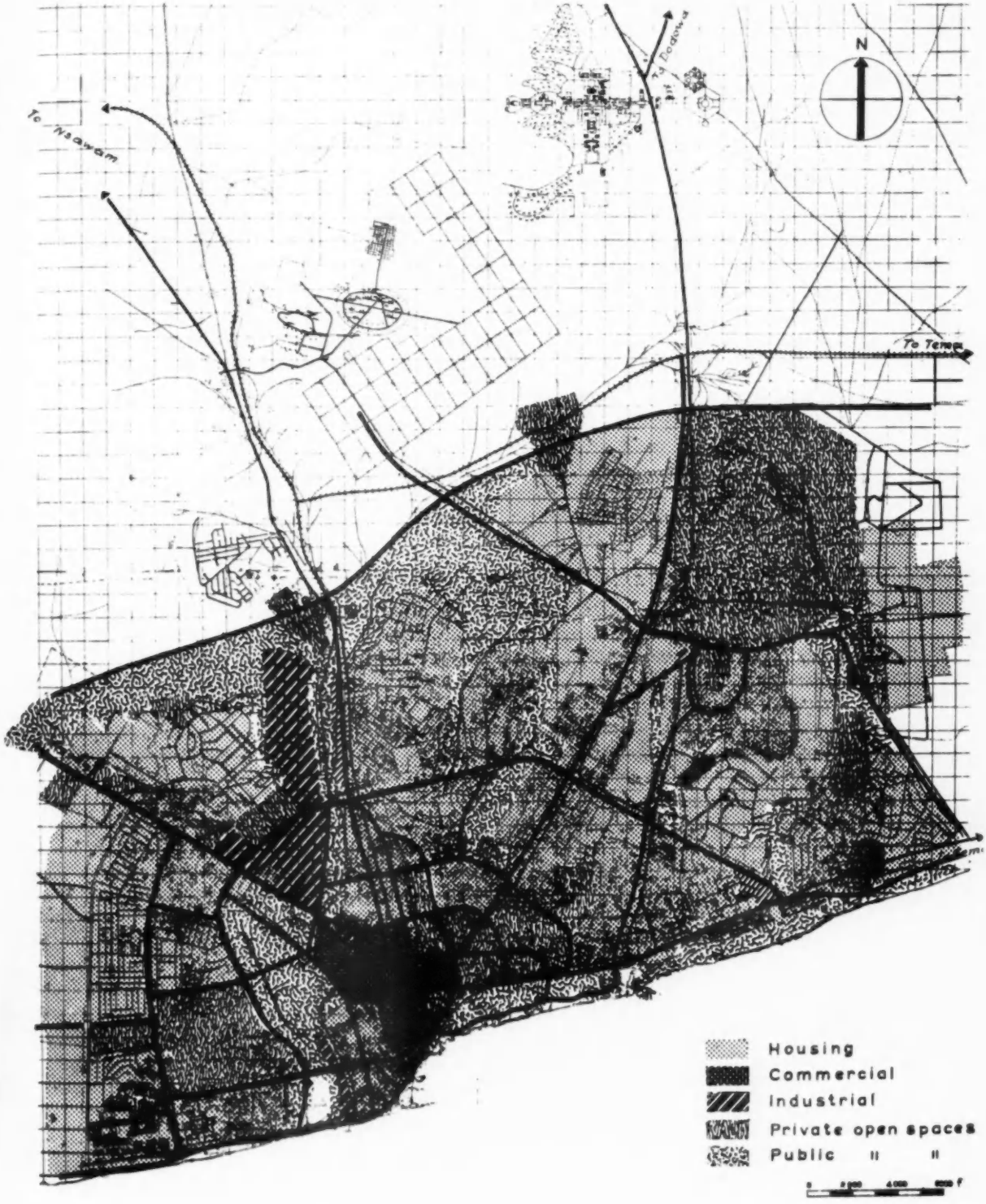
SUCCESSIVE STAGES OF DEVELOPMENT





ACCRA-TEMA THE GROWING CENTRES

THE MASTER PLAN OF ACCRA



a. Retention of ownership of the land by the Government. The Government would buy up such land in the development areas as did not belong to it and land would be made available on a leasehold basis, say for 99 years. This would have the double advantage of preventing speculation and at the same time facilitating future replanning and redevelopment. The institution of lease property exists in Ghana today and it is suggested that it should be extended to all the proposed urban development areas.

b. Implementation of all, or most, of the development schemes through Government initiative in the most vital areas, where the rise in values may be expected to be highest, followed by operation of the schemes by the Government - either directly or through specialized private organization - for a period extending over the initial stages, when the rise in values may reasonably be expected to be highest. When prices have more or less settled, the works (houses, buildings, facilities, factories, etc.) would be made available on a long-term basis to private persons, on the leasehold system. Vital areas will include the centres of towns, where a rapid rise in land values during the first years of development may be considered certain.

66. The above mentioned policies, of course, oblige the State to act as a businessman, both in terms of organization and capital. They are, however, highly advisable if the expected results are to be achieved. As far as the capital is concerned, this might be acquired by loans from abroad.

THE PROGRAM

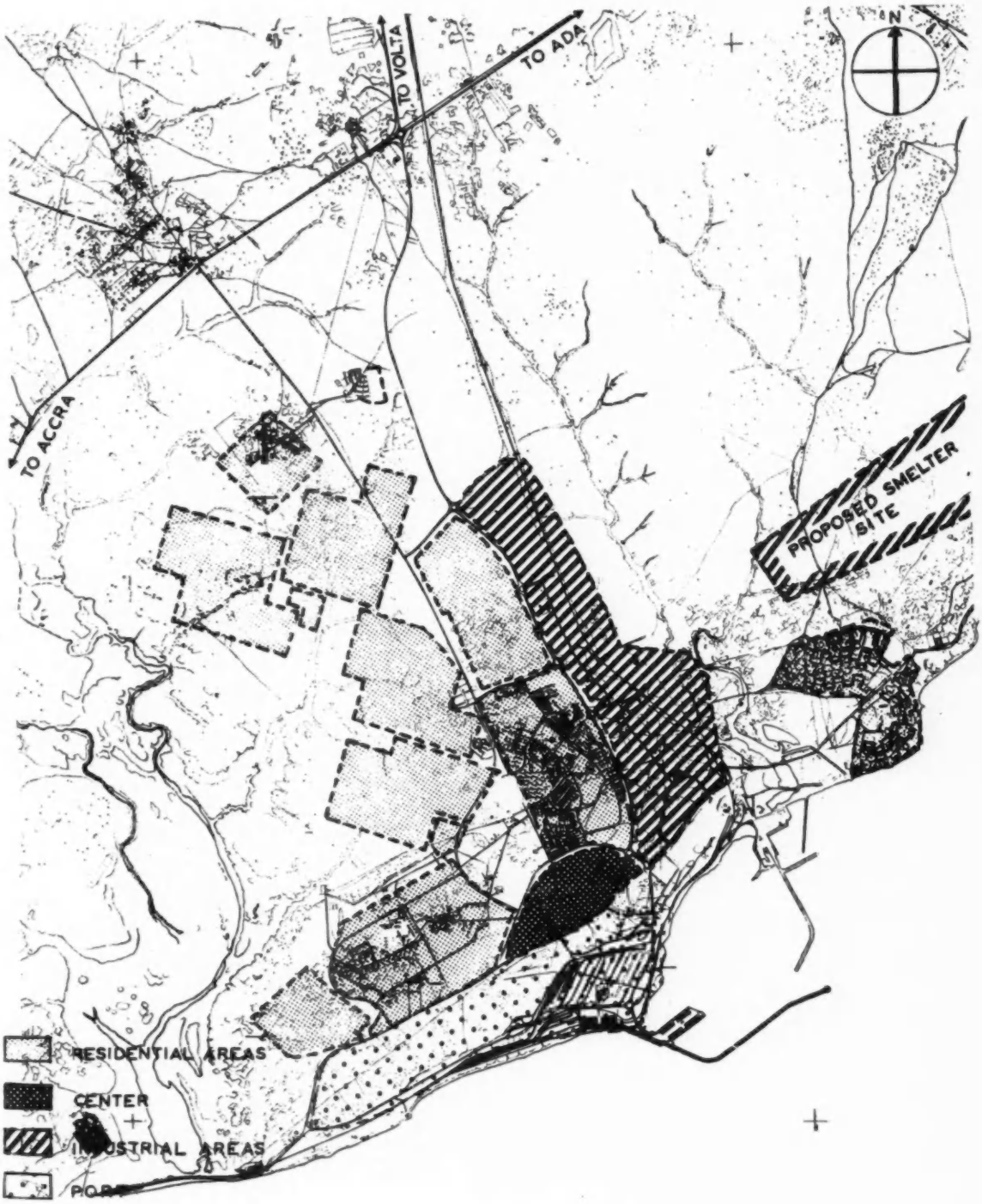
The Master Plan

67. The town and Country Planning Division of the Ministry of Housing and Public Works in the year 1958 studied the Accra plan and submitted it for approval. The plan goes into a thorough investigation of existing conditions, puts on record a set of general and particular projects and proposes the extension and organisation of the town into independent communities. It also proposes a plan for the redistribution of the population so as to create prospects of tolerable limits. The plan was prepared for a period of twenty years and anticipated a population of 383,000. However, according to the last population census, the population is increasing at a much faster rate.

68. The present Master Plan for Tema covers an area of about 5,000 acres, and makes provision for four main zones, as outlined below:

a. The residential zone with 7 communities, of which 4 are to be built during 1960-1961. Since each community will have 10,000 to 12,000 inhabitants two generations (needed, according to the Master Programme, for the completion of all 7 communities) will see the town with a total population of 80,000.

THE EXISTING MASTER PLAN



b. The industrial zone to the east is an extension of the present one. The area to be occupied by the aluminium smelter has been located outside the zone, to the north of the new Tema village.

c. The port zone.

d. The zone of the town centre.

69. We make an assumption that the density of population in our communities Class V and IV will be equal to 110 and 140 persons per hectare, which means a dwelling plot density of 280. If we assume 6 persons per family, then the above correspond to an average dwelling plot of about 250 sq. m.

70. On the basis of the above density we have fixed the necessary residential areas for the three phases of the next twenty-year period, i. e. for 1960-1964, 1964-1969 and 1969-1980. As regards Accra we take the potential of 383,260 persons provided for by the existing Master Plan. To this there is added, in accordance with the Master Plan of the entire metropolitan area as proposed by the present report, about another 630 hectares with a density of 140 persons per hectare, which finally raises the potential to 471,460 persons.

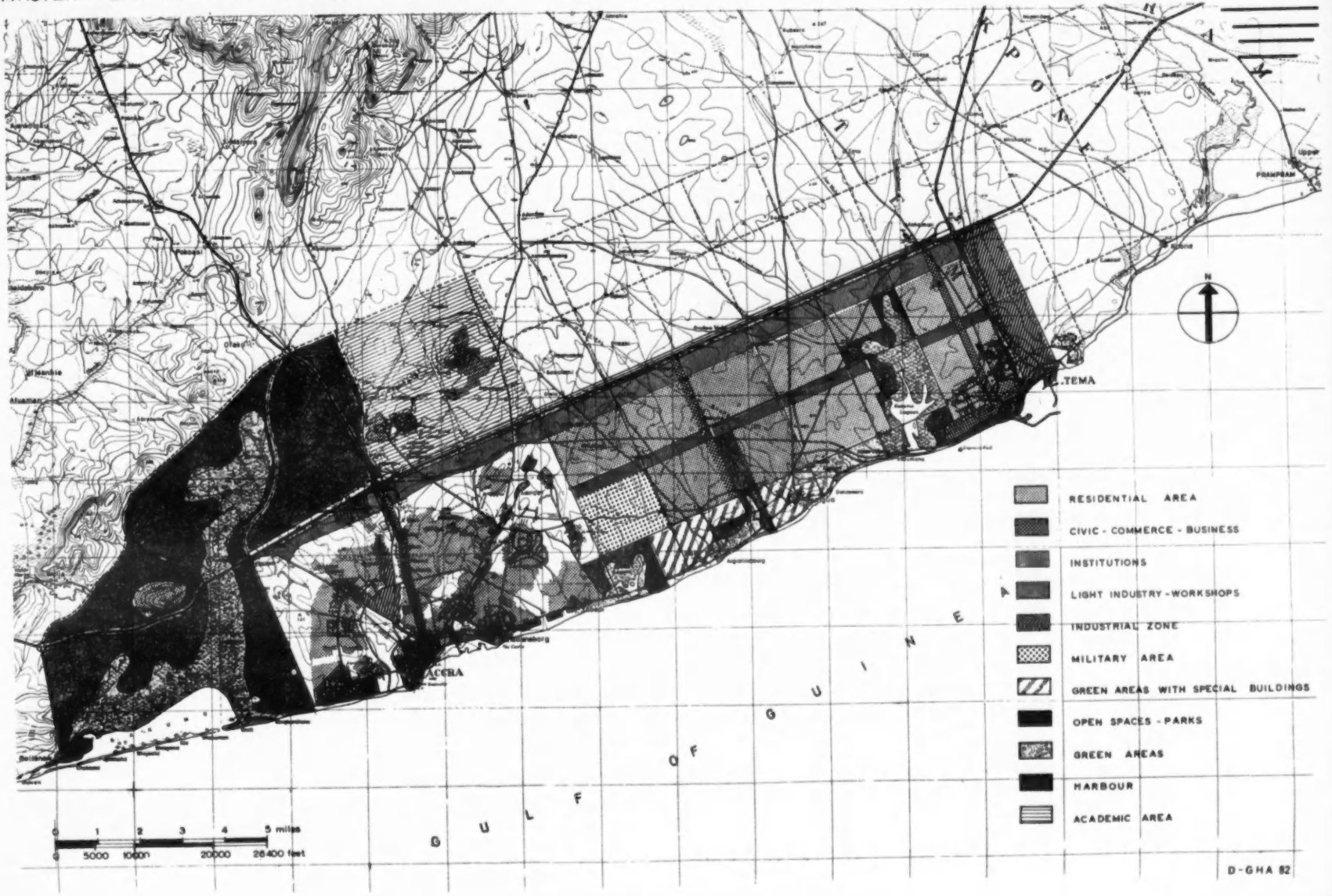
71. It will also be necessary to add 1,765 houses which will be needed following the demolition of slums and the thinning out of the population in the amelioration districts. We thus arrive at the following table.

Phases of Programming	Residential required area in hectares		
	Accra Town	Region	Total
1964	886*	280	1166
1969	1580*	730	2310
1980	1655*	2309	5729
	1765		
	3420		

72. The Master Plan as a whole is organised on a basic grid which is connected to the main axes linking the metropolitan area to the wider Volta region and the country as a whole. This grid embodies the existing master plan for the town of Accra and is composed of the following elements:

*Development within the limits of the existing Master Plan.

MASTER PLAN FOR THE METROPOLITAN AREA



a. The big Takoradi-Ada national highway running from East to West which should finally be continued in a direction generally parallel to the coast all along the distance between Accra and Tema.

b. Main roads parallel or perpendicular to the previous one at distances of three kilometres apart.

c. The coastal road which in general follows the line of the existing road.

d. The main road grid of the town of Accra, as provided in the existing Master Plan.

e. A ring-road and an inner road to the western low-land area which is intended for a park.

73. The dotted lines on the plan show the extension of the basic grid for the future development of the region.

The First Stage

74. Houses. In accordance with the rate of population growth which has been accepted, the Accra population will have increased by approximately 50,000 persons, or 8,250 families, in 1964. At the same time the population of the remainder of metropolitan area (Tema and villages) will have increased by 30,300 persons or 5,050 families. Thus within the 4-year period we shall have to cover the requirements of 13,300 new units of a total cost of:

13,300 units x 900 per unit - 11.970,000

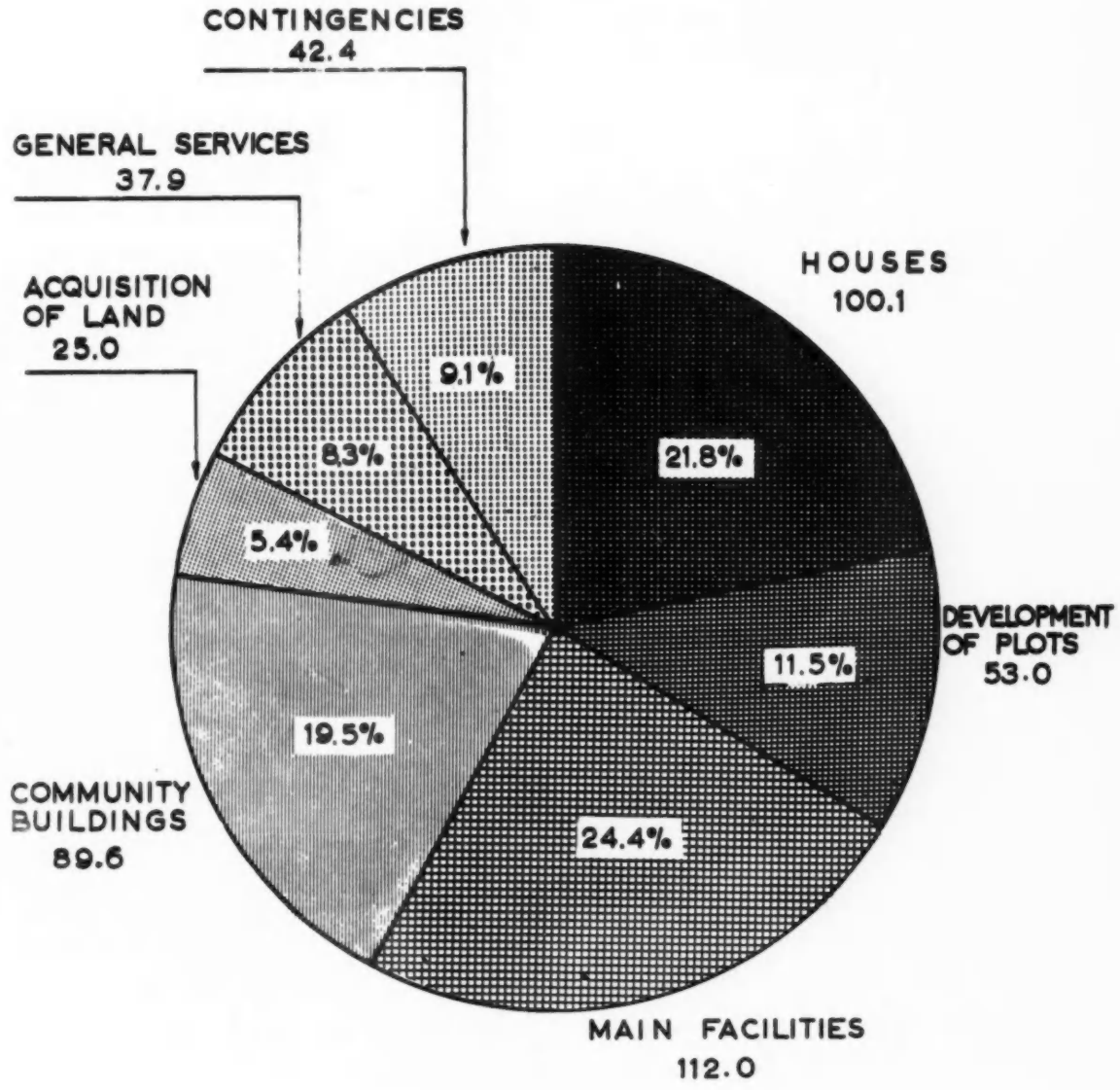
75. Land development. An average plot cost of 300 per unit has been assumed for 8,250 new units of Accra, (because some of the houses will be built in sparsely populated districts where some development has already materialized. The remaining 5,050 units of the metropolitan area will be erected in new communities where the plots will have to be fully developed. Thus the total cost of development concerning the 13,300 new units is estimated at $G 4,590,000, as follows:

8,250 units x	300 per unit -	2,475,000
5,050 units x	420 per unit -	2,121,000
Total 13,300 Units		4,596,000

76. Total of first phase (1960-1964). In accordance with the above, the growth of population during the four-year period 1960-1964 will create requirements involving the following sums as very rough estimates:

ACCRA - TEMA METROPOLITAN AREA
THE NEEDS UP TO 1980

FIGURES ARE GIVEN IN MILLION £G



TOTAL: 460.00

a.	Houses	11,970,000
b.	Land Development	4,600,000
c.	Main facilities	2,000,000
d.	Community buildings	10,520,000
	Total	£29,090,000

77. Total for the period 1964-1969. The meeting of the new requirements which will arise during the period 1964-1969 would involve roughly the following sums:

a.	Houses	18,225,000
b.	Land development	8,505,000
c.	Main facilities	33,000,000
d.	Buildings	15,820,000
	Total	£75,550,000

Financing

78. It will be necessary for land to be bought up and developed by the Government, or by a special Government organization, and afterwards either operated by it or made available to private persons. One of the advantages of the purchase of land by the Government or by a Government organization will be that the profits resulting from the rise in land values could provide a substantial source of funds for financing the programme, thus benefiting the community as a whole. The establishment and operation of an independent Government organization on the general principles outlined above would perhaps be the best solution, since it would then be more easily possible to raise funds to finance the programme by borrowing either at home or abroad. At the same time, as has already been emphasized, it will be essential to avert future speculation in land.

79. It should be pointed out, however, that although the application of these general principles will ensure the availability of substantial funds for the programme, most of the funds will not in fact be available at the time when the programme is being implemented. They will materialise, with growing rapidity, after the programme has been carried out. This means that it will be necessary at the time that the programme is being implemented to make available either freely or on a loan basis supplementary funds out of the Government Budget or the Economic Development Programme. At the same time, it will be advisable to obtain the maximum contribution from private sources by raising a loan at home and possibly even abroad. The recruitment of private savings at home will also be useful from a more general standpoint.

80. With regard to the construction of dwellings, it will be advisable for the majority of the funds to be derived ultimately from private savings.

In this field too, however, the Government will be called upon to play an important part. The Government housing programme for the urban centres of the country already provides for the following action by the Government.

a. The building of dwellings for rental of a cost involving Government subsidy.

b. The building of dwellings to be transferred gradually to families in the middle income groups.

c. The grant of housing loans to people in a financial position to service and repay them. The loans will cover only part of the expenditure , the borrower being obliged to make a certain contribution himself to the total cost of the building.

81. In each of the three above cases it is necessary for all or part of the funds initially required for the building of the dwellings to be obtained from sources other than the savings of the families who are to occupy them. Moreover, the plots are in many cases allotted on a credit basis or, more usually, leased for a long period, as a result of which the recovery of the funds originally spent is spread over a considerable number of years.

82. In these circumstances it will be necessary to find the funds to meet the major proportion of the cost of constructing the works needed, and in this the Government will have a decisive part to play. The basic aim should be to encourage and recruit the maximum possible contribution out of private saving. It will be necessary to study and devise ways and means of ensuring that private savings play the greatest possible part in financing the programme.

83. This Government Housing Programme emerges from the overall programme of requirements based on the following assumptions:

a. The full slum clearance project must be undertaken by the Government, as the income of the slum dwellers does not allow them to take any initiative whatsoever to effect their housing.

b. The same applies to the amelioration project which aims at reducing the density of habitation, as it has been accepted that the vast majority of the families in question belong to the low income groups.

c. As far as new houses for new families are concerned - families which will belong to all income groups, according to the existing distribution into income groups of the families of the Accra-Tema area - the following assumptions have been made:

i. Housing units intended for the low income groups - 55% of the total - will be built by the Government (each unit will be constructed by approximately 80%, the balance being added by the beneficiary family). The average cost of each unit was estimated at 500, because it was accepted that a certain number of the small-size families can be accomodated in only one main room plus necessary auxiliaries. This means that the average cost of the part (nucleus) which will be constructed by the Governement will amount to 400.

ii. Housing units intended for medium incomes - 35% of the total- will be constructed by the interested families aided by the Government either by providing materials, or building a nucleus, or lending money. This aid will not exceed on an average 30% of the cost. This means that the average unit will cost: 900 x 30% = 270.

iii. Housing units intended for high income groups - 10% of the total - will be constructed entirely by the families in question.

COMMUNITY BUILDINGS PROGRAMME I960-I969
FOR THE ACCRA-TEMA METROPOLITAN AREA
(in ,000 £G)

	The total programme			The Government programme		
	a. phase I960- 64	b. phase I964- 69	Total	a. phase I960- 64	b. phase I964- 69	Total
Buildings in the Residential Communities						
Accra : Slum clearance and amelioration schemes.	420	550	970	420	550	970
Accra : Existing communities	2,200	3,200	5,400	2,000	3,000	5,000
Accra : New housing units	I,980	4,752	6,732	I,680	4,I00	5,780
Tema : New housing units	2,000	3,267	5,267	I,725	2,825	4,550
T o t a l	6,600	II,769	I8,369	5,825	I0,475	I6,300
Accra : Central functions	6,400	9,000	I5,400	3,900	6,000	9,900
Tema : Centre	4,I40	3,600	7,740	3,000	2,500	5,500
T o t a l	I7,I40	24,369	4I,509	I2,725	I8,975	3I,700
Average annual activity	4,280	4,880	-	3,I80	3,800	-

COMMUNITY FACILITIES PROGRAMME 1960-1969
FOR THE ACCRA-TEMA METROPOLITAN AREA

	Cost per Unit £G	No of Units			Total cost ,000 £G (Government Expenditure)		
		a. phase 1960- 64	b. phase 1964- 69	Total	a. phase 1960 - 64	b. phase 1964- 69	Total
Development of plots for the Housing Programmes.							
Accra : Slum Clearance	190	2,700	2,200	4,900	513	418	931
Accra : Amelioration (new units)	190	1,000	2,100	3,100	190	399	589
Accra : Amelioration	100	2,400	5,600	8,000	240	560	800
Accra : New units	300	8,250	-	8,250	2,475	-	2,475
Accra-Tema: New units	420	5,050	20,250	25,300	2,121	8,505	10,626
T o t a l		19,400	30,150	49,550	5,539	9,882	15,421
Accra:Completion of facilities in existing residential communities.					4,700	6,000	10,700
Accra-Tema: Mains and installations outside the residential communities					22,000	33,000	55,000
T o t a l					32,239	48,882	81,121
Average annual activity					8,060	9,780	